3rd INTERNATIONAL CONFERENCE on INNOVATION & ENTREPRENEURSHIP and the 3rd INTERNATIONAL CONFERENCE on ENGINEERING & BUSINESS EDUCATION

Conference Proceedings

Theme: Trends and Prospects of Innovation and Entrepreneurship and its Implications in Engineering and Business Education amidst Global Economic and Environmental Crises

16-18 November 2010
Sofitel Philippine Plaza Manila
CCP Complex Roxas Boulevard, Pasay City, 1300 Manila, Philippines
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Preface by the Editors

This volume contains the proceedings of the 3rd International Conference on Innovation & Entrepreneurship (ICIE) and the 3rd International Conference on Engineering & Business Education (ICEBE) held in Manila on 16-18 November 2010. Each paper was double-blind reviewed by the ICIE & ICEBE board of reviewers.

This conference is held every two years. The first was held in China in 2006 and in the second in Germany. This year, it is held in the Philippines with La Consolacion College Manila (LCCM) hosting, in cooperation with Hochschule Wismar University of Applied Sciences, Technology, Business and Design (Germany) and the Philippine Academy of Management (PAOM). Authors are from different countries such as Australia, China, Indonesia, Germany, Latvia, Malaysia, Norway, Romania, Taiwan, R.O.C., United Arab Emirates, United Kingdom, United States of America, and from the Philippines.

The main theme of the 2010 conference is on "Trends and Prospects of Innovation and Entrepreneurship and its Implications in Engineering and Business Education amidst Global Economic and Environmental Crises". The conference focuses on the following topics:

1. Entrepreneurship Education and Research
2. Environmental, Social, and Corporate Entrepreneurship
4. Drivers and Barriers to Innovation
5. Business Incubation Management
6. Innovative Methods for Engineering and Business Education
7. Knowledge Management in Engineering and Business Education
8. Total Quality Management (TQM) in Engineering and Business Education
9. Internet and Web Applications in Engineering and Business Education
10. Synergy in Entrepreneurship, Engineering, and Business Education

This conference is expected to be a valuable forum for the dissemination of research findings and stimulation of discussions on trends and prospects of innovation and entrepreneurship and its implications in engineering and business education amidst global economic and environmental crises. This is being undertaken in conjunction with the Global Entrepreneurship Week.

La Consolacion College Manila
Hosting Institution
3rd ICIE & 3rd ICEBE

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Giovanni R. Barbajera
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The Role of Tertiary Education in Promoting Innovation and Entrepreneurship

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Abstract

The aim of this paper is to explore the role of university education in the development of an entrepreneurial culture among young undergraduates. According to Schumpeter (1942) the entrepreneur is primarily an innovator, who actively introduces various innovations in the productive process by using the scientific and technological developments for profit – yielding purposes. Moreover, the entrepreneurial innovation (Schumpeter, 1942) can take many forms: introduction in the market of a new or better quality product, creation of a new productive process, opening of a new market or, finally, the creation of a new form or organization of a firm. The fostering of entrepreneurial vision in students should be placed at the core of modern tertiary education. Consequently, we will argue that the syllabus of a typical university course on entrepreneurship should aim at identifying and mobilizing creative talent, enabling students to overcome hesitation and transforming their theoretical knowledge into innovative ideas and practical solutions. The practical analysis will draw on a survey carried out among 208 engineering students, results of which were partly published in 2009 (Alchim et al). We will also present pedagogical implications of teaching entrepreneurship to Romanian students focusing on socio – psychological factors underlying the process of teaching/learning.

Keywords: Entrepreneurship education, innovation-driven teaching/learning
Background

Nadim Ahmad and Richard Seymour (2008) presented in the Organisation for Economic Co-operation and Development (OECD) paper: *Defining Entrepreneurial Activity: Definitions Supporting Frameworks for Data Collection OECD Statistics Working Paper*, an overview of definitions of entrepreneur, entrepreneurship and entrepreneurial activity with a view to developing indicators to address and measure entrepreneurship. The table below lists the existing definitions of entrepreneurship, as they have been found in different authors’ works to date (Ahmad & Seymour, 2008, p. 7).

Table 1
*Summary of definitions to date*

<table>
<thead>
<tr>
<th>Definition</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneurs buy at certain prices in the present and sell at uncertain prices in the future. The entrepreneur is a bearer of uncertainty.</td>
<td>Cantillon, 1755/1931</td>
</tr>
<tr>
<td>Entrepreneurs are ‘pro-jectors’.</td>
<td>Defoe, 1887/2001</td>
</tr>
<tr>
<td>Entrepreneurs attempt to predict and act upon change within markets. The entrepreneur bears the uncertainty of market dynamics.</td>
<td>Knight, 1921, 1942</td>
</tr>
<tr>
<td>The entrepreneur is the person who maintains immunity from control of rational bureaucratic knowledge.</td>
<td>Weber, 1947</td>
</tr>
<tr>
<td>The entrepreneur is the innovator who implements change within markets through the carrying out of new combinations. These can take several forms: - the introduction of a new good or quality thereof; - the introduction of a new method of production; - the opening of a new market; - the conquest of a new source of supply of new materials or parts, and - the carrying out of the new organisation of any industry.</td>
<td>Schumpeter, 1934</td>
</tr>
<tr>
<td>The entrepreneur is always a speculator. He deals with the uncertain conditions of the future. His success or failure depends on the correctness of his anticipation of uncertain events. If he fails in his understanding of things to come he is doomed…</td>
<td>von Mises, 1949/1996</td>
</tr>
<tr>
<td>The entrepreneur is co-ordinator and arbitrageur.</td>
<td>Walras, 1954</td>
</tr>
<tr>
<td>Entrepreneurial activity involves identifying opportunities within the economic system.</td>
<td>Penrose, 1959/1980</td>
</tr>
<tr>
<td>The entrepreneur recognises and acts upon profit opportunities, essentially an arbitrageur.</td>
<td>Kirzner, 1973</td>
</tr>
<tr>
<td>Entrepreneurship is the act of innovation involving endowing existing resources with new wealth-producing capacity.</td>
<td>Drucker, 1985</td>
</tr>
<tr>
<td>The essential act of entrepreneurship is new entry. New entry can be accomplished by entering new or established markets with new or existing goods or services. New entry is the act of launching a new venture, either by a start-up firm, through an existing firm, or via ‘internal corporate venturing’.</td>
<td>Lumpkin &amp; Dess, 1996</td>
</tr>
<tr>
<td>Entrepreneurship is any attempt at new business or new venture creation, such as self-employment, a new business organization, or the expansion of an existing business, by an individual, a team of individuals, or an established business.</td>
<td>Reynolds, Hay &amp; Camp, 1999</td>
</tr>
</tbody>
</table>
• The field of entrepreneurship involves the study of sources of opportunities; the processes of discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate, and exploit them. (Shane & Venkataraman, 2000)

• Entrepreneurship is a context dependent social process through which individuals and teams create wealth by bringing together unique packages of resources to exploit marketplace opportunities. (Ireland, Hitt, & Sirmon, 2003)

• Entrepreneurship is the mindset and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new or an existing organisation. (Commission of the European Communities, 2003)

As can be understood from the above table, it was Joseph Schumpeter (1934) who first associated the notion of entrepreneurship with that of innovation, which is widely shared today as well. According to Schumpeter (1934), entrepreneurship reflects all of the following characteristics: (1) the launch of a new (or improved) product; (2) the establishment of a new method of production; (3) the opening of a new market; (4) the exploitation of a new source of supply; and (5) the re-engineering/organization of business management processes.

Further on, the authors of the above mentioned OECD working paper analyse the entrepreneurial activity as perceived within its commercial and wider environment. The entrepreneur blends a backward look onto resources (which he combines in new and creative ways) and a forward look onto markets (to identify new or untapped opportunities). In the process of entrepreneurial activity, the entrepreneur strives to create value operating in the business environment which in turn is affected by the wider economic, political, legal, social, cultural, social, and natural environment (Ahmad & Seymour, 2008, p. 8-9).

Figure 1. Entrepreneurial activity within its commercial and wider context

<table>
<thead>
<tr>
<th>Creative resources</th>
<th>Innovative capabilities</th>
<th>Perceiving opportunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>invention/creativity</td>
<td>perceive and recognise a fit</td>
<td>un-met market need</td>
</tr>
<tr>
<td>technology changes</td>
<td>secure resources and markets</td>
<td>under-deployed resources</td>
</tr>
<tr>
<td>change of/in property</td>
<td>employ and develop capabilities</td>
<td></td>
</tr>
<tr>
<td>new capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>unique employees</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Commercial environment
competition, environment, (national) economic structures

Natural, Social and Cultural environment
In summary, the definitions outlined above reveal 3 major areas of concern: (1) enterprising human activity (setting up corporations, joint ventures or registering as a sole trader); (2) the integration of creative resources with innovative capabilities and identifying market opportunities; and (3) the creation of value (economic, cultural or social).

In view of the above mentioned analysis and discussions, entrepreneurship represents the process of identifying and seizing (enterprising human activity) the opportunities which create value (Ahmad & Seymour, 2008, p. 14). The definitions provided by the authors are the following:

- **Entrepreneurs** are those persons (business owners) who seek to generate value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.
- **Entrepreneurial activity** is the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets.
- **Entrepreneurship** is the phenomena associated with entrepreneurial activity.

**Research Question**

How can we integrate entrepreneurial education within the tertiary curriculum, with particular focus on the Romanian engineering education context?

**Objectives of the Study**

1. to explore entrepreneurship education in general;
2. to analyse entrepreneurship education with reference to the Romanian educational context;
3. to review entrepreneurship education in Romania with reference to engineering studies at the University of Alba Iulia;
4. to present the results of a questionnaire administered among 208 students of engineering and to interpret the data obtained;
5. to make further suggestions for the integration of entrepreneurship education within the academic curriculum.

Policy makers now consider entrepreneurship in association with innovation to ensure sustained economic growth. Both entrepreneurship and innovation are linked with “doing something new” and government policies, if they are adapted to the particular situation in one country, can synergise in order to (re-)create economic dynamism. This dynamic process of new firm creation generates and distributes innovative products, processes and organisational structures across the economy. Therefore, the attention now given by all policy makers at national, European and international levels to fostering entrepreneurship comes as no surprise.

Education represents one of the most important elements of human capital, as it can be a significant source of knowledge, skills, problem-solving ability, discipline, motivation and self-confidence (Cooper et al., 1994). All these characteristics are an asset to educated entrepreneurs, who can better address the problems they may be facing. Moreover, they can gear their knowledge to searching and acquiring additional resources. Research has shown that education is positively linked to individual earnings (Becker, 1993), and that education has greater returns for self-employment than for waged employment (Evans & Leighton, 1989). Higher levels of education can give entrepreneurs the confidence, motivation and skills to own more than one business.

Since entrepreneurship represents a crucial element of today’s society, as it contributes to job creation and growth, increases competitiveness, boosts and fulfils individual potential, and moreover,
responsible entrepreneurship serves societal interests, it follows naturally that educators should turn their attention to integrating this component into the school curricula.

According to the Green Paper: Entrepreneurship in Europe (2003), “education and training should contribute to encouraging entrepreneurship, by fostering the right mindset, awareness of career opportunities as an entrepreneur and skills”. Research carried out by the Eurobarometer shows that 37% of Europeans are considering or had considered becoming entrepreneurs; although only 15% saw their dreams come true. Another element revealed by the survey was the fact that subjects with self-employed parents were found to be more ‘self-employed-oriented’ than those with parents who were employees. Indeed, the occupation of parents can influence the extent to which a person is exposed to management and entrepreneurship. Having at least one business owner parent can help develop the human capital of the individual but also change one’s expectations about what business ownership entails. Individuals whose parents are business owners appear to be much more likely to follow into their parents’ footsteps and become business owners themselves (Evans & Leighton, 1989; Curran et al., 1991; Bruderl et al., 1992). Another survey published by GEM showed that people who are confident about their skills and experience are between two and seven times more likely to be involved in starting or running a new business; those that have friends or acquaintances who recently started a business are three to four times more likely. According to the British Household Survey, people previously exposed to entrepreneurship (through friends, family or education) were more likely to earnestly envisage starting a business. The education system can develop capabilities, as well as provide exposure so as to foster entrepreneurial behaviour in students (CEC, 2003, p. 12-13).

We all admit that one of the most important challenges of nowadays governments, regulators, public policy makers and educators is how best to balance unlimited technological resources and limited public resources. The answer could be found in creating an entrepreneurial society which will contribute to speeding up the pace of change, facilitating further learning and re-learning on a permanent basis. Setting up a business entails drive, creativity and persistence, while developing a business gradually calls for more managerial skills, such as efficiency, effectiveness and reliability. If we take into account that both personality and management skills are key ingredients of success, personal skills relevant to entrepreneurship need to be taught from an early stage and be continued up to university level, where the educators can focus on building management capacity. The European Commission found that most Member States, to varying degrees, are now committed to promoting the teaching of entrepreneurship in their education systems.

As part of university education, entrepreneurship training should not only be for MBA students, it should also be offered to students in other fields. For example in technical universities entrepreneurship training may contribute to developing entrepreneurial potential alongside the technological one. Entrepreneurship education associated with public research programmes can strike the right balance between scientific excellence and the commercialisation of results. What characterises successful entrepreneurs is not that different from the qualities of successful engineers. Among these entrepreneurial qualities we can mention intelligence, creativity, risk management, tolerance of uncertainty and persistence in achieving an inner directed goal. Nevertheless, these are also the characteristics all people, engineers included, who bring about innovation. Educating young people to develop an entrepreneurial character and behaviours will also contribute to equipping them for productive careers as true leaders in the engineering profession. “Imbedded in the distinction between an invention and an innovation is a process whereby inventions become applied. This process is central to what we call entrepreneurship” (Audretsch et al., 2002).

According to Drucker (2007), what defines an entrepreneur in a business and in any other non-business institution or organisation is their attitude to change: “The entrepreneur always searches for change, responds to it as an opportunity”. Entrepreneurs can only exploit change through the process of innovation. The same scholar defines ‘systematic innovation’ as a “purposeful and organised search of the opportunities such changes might offer for economic and social innovation” (Drucker, 2007).
The Global Entrepreneurship Monitor published in 2008 an executive report which gathered findings pertaining to conditions and factors that influence entrepreneurship, i.e. entrepreneurial attitudes, activities, aspirations, etc. The above mentioned report includes a section on education and training, revealing the relationship between training in starting a business and entrepreneurial attitudes, aspirations and activity. The GEM model identifies Entrepreneurship Education and Training as an entrepreneurial framework condition that influences levels of entrepreneurial attitudes, aspirations and activity, which in turn affect the level of new enterprises in the economy. The 43 countries analysed were ordered according to three phases of economic development as presented in the Global Competitiveness Report 2008-2009. Sala-i-Martin, et.al. (2008) characterise competitiveness as the set of institutions, policies, and factors that determine the country’s level of productivity. Accordingly, competition includes static and dynamic components classified into open-ended, though interrelated and mutually reinforcing, 12 pillars of economic competitiveness. Different pillars affect different countries in a different way. Respective sets of pillars are key factors to corresponding stages of economic development. Factor-driven economies compete based on their factor endowments, primarily unskilled labor and natural resources. Along with rising wages, countries move into the Efficiency-driven stage and compete based on more efficient production processes and increased product quality. In the last and third stage, the Innovation-driven stage, companies must compete through innovation, producing new and different goods using the most advanced production processes. According to this classification, Romania is an efficiency-driven economy. Bosma, et al. (2008) analyse the relationship between the level of competitiveness and the level of entrepreneurship, stating that an increase in economic productivity will favour the formation of financial capital and to the opening up of niches in industrial supply chains. These phenomena, together with financial capital from the emerging banking sector, would contribute to the development of small and medium-sized manufacturing sectors.

The following table presents the percentage of working age adults who received training in starting a business in some efficiency-driven economies, Romania included.

Table 2
Percentage of the population aged 18-64 that received voluntary or compulsory training in starting a business during or after school, by type of country

<table>
<thead>
<tr>
<th>Efficiency-Driven Economies</th>
<th>School voluntary</th>
<th>School compulsory</th>
<th>School any</th>
<th>After school voluntary</th>
<th>After school compulsory</th>
<th>After school any</th>
<th>Any training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>6.4</td>
<td>3.2</td>
<td>9.6</td>
<td>7.3</td>
<td>3.6</td>
<td>10.9</td>
<td>17.4</td>
</tr>
<tr>
<td>Brazil</td>
<td>4.5</td>
<td>0.8</td>
<td>5.3</td>
<td>1.6</td>
<td>5.0</td>
<td>6.6</td>
<td>9.4</td>
</tr>
<tr>
<td>Chile</td>
<td>16.8</td>
<td>8.5</td>
<td>25.3</td>
<td>18.9</td>
<td>13.8</td>
<td>32.7</td>
<td>42.5</td>
</tr>
<tr>
<td>Croatia</td>
<td>8.6</td>
<td>11.1</td>
<td>19.7</td>
<td>8.0</td>
<td>7.6</td>
<td>15.6</td>
<td>27.6</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>4.7</td>
<td>0.6</td>
<td>5.3</td>
<td>1.9</td>
<td>2.1</td>
<td>4.0</td>
<td>7.7</td>
</tr>
<tr>
<td>Hungary</td>
<td>2.8</td>
<td>14.2</td>
<td>17.1</td>
<td>1.4</td>
<td>8.6</td>
<td>10.0</td>
<td>24.4</td>
</tr>
<tr>
<td>Jamaica</td>
<td>6.8</td>
<td>9.2</td>
<td>16.0</td>
<td>2.9</td>
<td>6.4</td>
<td>9.3</td>
<td>21.0</td>
</tr>
<tr>
<td>Latvia</td>
<td>6.1</td>
<td>8.4</td>
<td>14.5</td>
<td>9.0</td>
<td>10.1</td>
<td>19.1</td>
<td>28.0</td>
</tr>
<tr>
<td>Macedonia</td>
<td>10.3</td>
<td>2.3</td>
<td>12.6</td>
<td>7.2</td>
<td>3.7</td>
<td>10.9</td>
<td>19.1</td>
</tr>
<tr>
<td>Mexico</td>
<td>5.8</td>
<td>3.6</td>
<td>9.5</td>
<td>3.6</td>
<td>5.9</td>
<td>9.5</td>
<td>15.5</td>
</tr>
<tr>
<td>Peru</td>
<td>11.5</td>
<td>2.9</td>
<td>14.4</td>
<td>12.2</td>
<td>12.5</td>
<td>24.7</td>
<td>29.6</td>
</tr>
<tr>
<td>Romania</td>
<td>3.3</td>
<td>2.2</td>
<td>5.5</td>
<td>2.8</td>
<td>1.8</td>
<td>4.6</td>
<td>8.0</td>
</tr>
</tbody>
</table>
The next table lists the percentage of people who took part in training in starting a business after primary or secondary school, by type of training provider, as well as whether training was compulsory or voluntary. The information is relevant for the fact that the most frequent source of training was self-directed learning, e.g. reading about, observing or working for other people’s businesses, then on the second place came voluntary formal education and by voluntary training offered by a college or university, however outside the formal education system. Romania has a relatively low rate of voluntary or compulsory training.

Table 3
*Percentage of the population aged 18-64 that received any training in starting a business after school, by type of training provider*

<table>
<thead>
<tr>
<th>Efficiency-Driven Economies</th>
<th>Type of Training Provider</th>
<th>Self Directed Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>College formal</td>
<td>College informal</td>
</tr>
<tr>
<td>Argentina</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Brazil</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Chile</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>Croatia</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Hungary</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Jamaica</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Latvia</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Macedonia</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Mexico</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Peru</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Romania</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

*Note: V – Voluntary training  C - Compulsory training*

In conclusion, the GEM Report revealed that the relationship between training in starting a business and entrepreneurial attitudes, aspirations and activity is generally positive, but is different according to phase of economic development.

**Methodology**

In order to get more insights into the knowledge and attitudes of Romanian students regarding entrepreneurship we carried out a survey among 208 engineering students, who answered a questionnaire structured into two main parts: entrepreneurial knowledge and entrepreneurial skills. The results of the first part of the questionnaire were analysed and interpreted in an article published in 2009 (Achim et al).

The questionnaire was administered among students of Applied Electronics, Cadastre and Environmental Engineering, aged 19-46. They were students either in the first or in the third year of study (16 of the respondents did not reveal this information). 134 of the respondents were male, 67 female and 7 did not reveal their gender. Mention should be made of the fact that there was a marked preponderance of
male students among the respondents (66.7%). The questionnaire was anonymous and the identity of respondents was never revealed.

The average age was 22.69 years, which may explain the students’ lack of specific knowledge related to entrepreneurship, as at this age, they have little, if any connection with the business world. The majority of the respondents were in their first year of study (119 respondents). At present there is no course in entrepreneurship taught to engineering students at The University of Alba Iulia, which accounts for the fact that even if students had some specialist knowledge, it was not acquired through formal education at tertiary level (see also Achim et al., 2009).

The results of the questionnaire were processed using the SPSS statistical analysis software. The final analysis of the data obtained comprised both quantitative and qualitative interpretation.

Results and Discussion

In a nutshell, the entrepreneurial knowledge of the students was rather limited. The first question referred to the legal statuses of Romanian companies. Out of 8 existent types, only 2 were better known: SRL (70.7%) and SA (63.0%). The remaining 6 were little or not at all known: SNC (13.5%), PFA, SCS, SCA (5.3%) and I, IF (0.0%). The second question tested the knowledge pertaining to the process of setting up a business in Romania. The best known stages were establishing the field of activity (14.4%) and registering with the Trade Register (14.9%). These results are rather alarming as far as how little Romanian engineering students know about setting up a business in Romania. The third question referred to the minimum legal start up capital in Romania. Respondents seemed more familiar with the start-up capital for private limited companies (SRL). Absolutely no correct answer was provided for SA’s. (SRL: RON 200 / SA: EUR 25,000). The fourth question addressed the issue of the most important skills of an entrepreneur. The percentage of expected answers (risk-taking, creativity and/or innovation, tolerance of uncertainty, commitment to achieving an inner directed goal, intelligence, sound management) was rather reduced. Romanian students did not consider risk-taking as an important entrepreneurial skill. The fifth question made references to the sources of business ideas. The answers polarised around market research (12.5%) and mass-media (13.9%). The sixth question was meant to unveil the fields that are considered by students as having potential for small business in Romania. The relatively positive attitude toward ecoagriculture, agritourism, environment protection, alternative energy could have been generated by the fact that 22.1% of the respondents were students in environmental engineering. The seventh question referred to the most important issues to consider when employing and keeping personnel. Given the fact that salaries are generally low in Romania, financial rewards counted amongst the most important factor. The eighth question tested the students’ knowledge of dealing with customers. The highest on the list were achieving customer loyalty (8.2%) and customer-oriented behaviour (including respect, trust, and politeness) (7.2%). The ninth question assessed the students’ knowledge of the elements of a business plan. Results obtained here revealed a clear lack of specific knowledge about entrepreneurship – the highest percentage (4.8%) was recorded for product/service, market place (competition, customers, suppliers, production). The last question was of the open-end type and aimed at revealing students’ creativity with regard to setting up a business. The answers given by respondents showed a rather high level of confidence in the Romanian banking system (16.8%) (for complete data, see Achim et al., 2009).

The second part of the questionnaire assessed students’ entrepreneurial skills and drive. In the following we will present the relevant findings to each question.
Figure 2. Result on Entrepreneurial Skill – Creative thinking question (I find new ways to solve problems)

Fifty-seven percent (57.3%) of the respondents considered themselves as quite capable of creative thinking, while only 2.9% deemed themselves as not having this trait developed.

Figure 3. Result on Entrepreneurial Skill - Planning and research question (I know how and where to find information and how to use it)

Forty-nine percent (49.0%) of the students assessed themselves as quite capable of planning and research, whereas 5.3% considered that they didn’t have this skill developed.
The answers to the third question were quite similar with those of the previous two – 53% of the respondents answered that they possessed this ability while 4.8% replied that it was not developed.

This question recorded a higher percentage of respondents who possess organisation skills – very capable (29.8%), while 3.4% do not have this ability.
Forty-four percent (44.2%) of the respondents considered themselves as quite capable of communicating orally, whereas 3.4% assessed their communication skills as being low.

In the case of written communication skills, 42.3% considered themselves quite capable, 19.2% very capable and 3.4% considered that they did not possess this skill.
Figure 8. Result on Entrepreneurial Skill – Team-building question (*I know how to assemble, motivate, and empower an effective team*)

More than third (37.5%) of the respondents were of the opinion that they were quite capable of teambuilding, while 31.3% deemed themselves as possessing the skill at a beginner level and 20.7% considered that they were very adept at this skill.

Figure 9. Result on Entrepreneurial Skill – Marketing - selling question (*I know how to sell and can describe what selling involves*)

The answers given to the eighth questions were different from all the previous ones, in that the highest percentage was recorded by the respondents who considered themselves beginners in marketing (40.4%).
Figure 10. Result on Entrepreneurial Skill – Financial management question (*I know how to manage cash flow and how to read a bottom line*)

As far as financial management skills were concerned, 39.4% of the respondents assessed themselves as quite capable, while 12.5% responded that they considered this ability not developed.

Figure 11. Result on Entrepreneurial Skill – Record keeping question (*I can identify and use business forms; file and record financial transactions*)

Record keeping is a skill that can only be developed through learning and practice, which motivates the answers of the respondents, who admitted that this ability was incipient (35.6% - beginner) or not developed (23.1%).
Forty five percent 45.2% of the students considered that they are quite capable of setting their goals, while 7.2% admitted they did not have this skill developed.

Another high percentage of beginners was recorded for the business management skills (35.1%), while 14.9% of the respondents considered that this ability was not developed in their case.
The last questions referred to the respondents’ family attitude toward the implications of starting up a business and its impact on family life. Relevant in the responses to this last question was the cultural specificity of Romanians, for whom personal property is highly valued, and the need for security is rather high. There was a significant percentage of respondents who admitted that their family would not readily invest personal finances in the business.

Table 4  
*Family attitude toward the implications of starting up a business*

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes</th>
<th>No</th>
<th>Non-answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>No holiday this year</td>
<td>150</td>
<td>43</td>
<td>15</td>
</tr>
<tr>
<td>Working longer hours</td>
<td>167</td>
<td>28</td>
<td>13</td>
</tr>
<tr>
<td>Providing personal finances for the business</td>
<td>98</td>
<td>96</td>
<td>14</td>
</tr>
<tr>
<td>Preparedness for erratic income</td>
<td>129</td>
<td>63</td>
<td>16</td>
</tr>
</tbody>
</table>

Figure 14. *Family attitude toward the implications of starting up a business*
Conclusion

The most important conclusion of the questionnaire we administered among the Engineering students was the fact that they definitely need specific training in entrepreneurship, although this only would not be sufficient to prepare them for the challenges posed by setting up a small business in Romania. This training in entrepreneurship should be coupled with courses in accounting, business law, finances, etc.

The syllabus outlined in Achim, et al. (2009) is meant to give engineering students a basic introduction to entrepreneurship studies. We recommend that this course be compulsory (for one semester, 28 contact hours, 14 weeks), whereas other complementary courses in financial management, human resources management, accounting, business law, etc. can be offered as a package of optional courses.

7. Basic regulation for becoming an employer. Types of business company structure in Romania.
9. Taxation, insurance, banking. Case studies of Romanian banks’ help for SME’s.
11. Drafting the business plan, adjusted to individual needs and business ideas. Plenary presentations.
12. The concept of SWOT analysis. Board analysis and final evaluation of business plans.
13. Writing a report on effectiveness of business plans and planning the future of the business, starting from the previous SWOT analysis.

Recommendations

Further recommendations drawn from the research carried out will have to focus on the following main directions:
1. Creating a proactive campus environment, which will foster an entrepreneurial mindset and will spark out and further support free enterprise. To this end, a close relationship between the academia and the business world is encouraged, in order to even support the creation of incubation programmes for graduates who would like to start on their own, by offering them management counselling.
2. Contributing to a real shift in students’ negative attitudes and perceptions regarding the prospect of starting up a business (including the fear of failure, which should be regarded a a natural part of
being an entrepreneur). To this end, information and counselling campaigns may be organised on campus.

3. Introducing a practical component within the entrepreneurship course – by setting up “virtual enterprises” on campus. It would be desirable that these practical applications are run in cooperation with the local chamber of commerce, who could even assess the viability of the final business plans, and could even offer incentives in the form of further specialist advice for setting up a business/financial planning, etc.

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Enterprise 2.0 in Engineering and Business: Engineering and Business Students’ Views

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Abstract

Contemporary engineers and entrepreneurs need to become more cognizant and responsive to the emerging needs of the market for engineering, enterprise and technology services. This paper aims to analyze student engineers’ and entrepreneurs’ views on Enterprise 2.0 of Web 2.0 technologies within engineering and business education. The study demonstrates how the key concept is related to the idea of engineering and business education and how the steps of the process are related: determining Enterprise 2.0 → revealing Enterprise 2.0 within engineering and business education → empirical study within a multicultural environment. This research was conducted during the implementation of Bachelor’s programmes at the Faculty of Engineering and at the Faculty of Business of Wismar University, University of Technology, Business and Design, Germany and in the Fifth Baltic Summer School Technical Informatics and Information Technology at the Institute of Computer Science of the Tartu University, Tartu, Estonia. Results reveal that the student engineers’ and entrepreneurs’ views on the use of Enterprise 2.0 for individual, organizational and professional purposes are heterogeneous. However as shown by the Fifth Baltic Summer School, students are able to adopt new technologies and gain benefits easily. Findings led to the conclusion that the student engineers’ and entrepreneurs’ views on Enterprise 2.0 in engineering and business education are condition for successful use of Enterprise 2.0 in acquiring engineer’s and entrepreneur’s profession.

Keywords: Enterprise 2.0 for individual, organizational and professional purposes, Engineering and Business Education
Background

The primary target for software, namely, service is enterprise (Vossen, 2009, p. 38). Enterprises benefit from Web 2.0 where the increased data exchange within the system are no longer a limiting parameter with the current developments in the infrastructure. All dimensions of Web 2.0, namely, the infrastructure dimension, the functionality dimension, the data dimension, and the social (or socialization) dimension are on their path into the enterprise (Vossen, 2009, p. 33, 38). Typical Enterprise 2.0 of Web 2.0 techniques and technologies include “social software”, namely, Skype, the eBay seller evaluation, the Amazon recommendation service, or Wikipedia, etc., and online social networks, namely, a blog, or Facebook or MySpace for mostly private applications, LinkedIn or Xing for professional applications, or as Twitter for both (Vossen, 2009, p. 37) and have found widespread acceptance in the community.

The aim of the following paper is to analyze student engineers’ and student entrepreneurs’ view on needs in Enterprise 2.0 technologies within engineering and business education on the pedagogical discourse. The meaning of the key concepts of Enterprise 2.0 and needs analysis is studied. Moreover, the study demonstrates how the key concepts are related to the idea of education and shows a potential model for development, indicating how the steps of the process are related following a logical chain: determining enterprise → revealing Enterprise 2.0 in education → defining needs analysis → carrying out an empirical study within a multicultural environment.

The methodological foundation of the present research on the student engineers’ and student entrepreneurs’ views on needs in Enterprise 2.0 within engineering and business education is formed by the System-Constructivist Theory based on Parson’s System Theory (Parson, 1976, pp. 9-30) where any activity is a system, Luhmann’s theory (Luhmann, 1988, pp. 1-14) which emphasizes communication as a system, the theory of symbolic interactionalism (Mead, 1973; Goffman, 2008) and the theory of subjectivism (Groeben, 1986). The application of this approach to learning introduced by Reich (Reich, 2005) emphasizes that the human being’s point of view depends on the subjective aspect (Maslo, 2007, p. 43): everyone has his/her own system of external and internal perspectives (Figure 1) that is a complex open system (Rudzinska, 2008, p. 366), and experience plays the central role in a construction process (Maslo, 2007, p. 39). Therein, the subjective aspect of the human being’s point of view is applicable to the present research on the students’ needs in Enterprise 2.0 within engineering and business education.

Figure 1. Developing the System of External and Internal Perspectives

<table>
<thead>
<tr>
<th>External Perspectives as a Life Necessity</th>
<th>Internal Perspectives as a Life Necessity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• conscious</td>
<td>• unconscious</td>
</tr>
<tr>
<td>• learning</td>
<td>• acquisition</td>
</tr>
<tr>
<td>• foreign language</td>
<td>• mother tongue</td>
</tr>
<tr>
<td>• systematic</td>
<td>• non-systematic</td>
</tr>
<tr>
<td>• from abstract to concrete</td>
<td>• from concrete to abstract</td>
</tr>
<tr>
<td>• thought generalization</td>
<td>• object generalization</td>
</tr>
</tbody>
</table>

3rd International Conference on Innovation and Entrepreneurship and 3rd International Conference on Engineering and Business Education
The remaining part of this paper is organized as follows: Section 2 introduces enterprise. Enterprise 2.0 in education is studied in Section 3. The associated results of an empirical study will be presented in Section 4. Finally, some concluding remarks are provided in Section 5, followed by a short outlook on interesting topics for further work.

Defining Enterprise

Oganisjana and Koke (2008) point out that “entrepreneurship” and “enterprise” are used synonymously in many publications. However, the distinctive use of these terms is emphasized by Kearney (1999).

Entrepreneurship mainly concerns business and commerce: entrepreneurship defined as an individual’s ability to turn ideas into action includes creativity, innovation and risk taking, as well as the ability to plan and manage projects in order to achieve objectives (Commission of the European Communities, 2006, p. 4). This supports everyone in day-to-day life at home and in society, makes employees more aware of the context of their work and better able to seize opportunities, and provides a foundation for entrepreneurs establishing a social or commercial activity (Commission of the European Communities, 2006, p. 4).

Enterprise defined as an individual’s complex capability to identify, generate and realize new socially valuable opportunities in the personal, professional, cultural, economic and other contexts of the social life (Oganisjana & Koke, 2008, p. 225), is considered in a broader social context than within business framework only, namely, to run a club, to make a film, to run a household or to run a good classroom or to help oneself and others. Moreover, enterprise is fostered to work in favour but not to damage the society (Oganisjana & Koke, 2008, p. 225).

The inter-connections between enterprise and entrepreneurship reveal that the term enterprise involves entrepreneurship as highlighted in Figure 2. Thus, every student, including students in engineering and business education, is involved with enterprise.

Figure 2. The relationships between enterprise and entrepreneurship.
Enterprise 2.0 in Engineering and Business Education

The paradigm shift from the entrepreneur’s personality (Oganisjana & Koke, 2008, p. 221-222) to the enterprising process employs a broad usage of Web 2.0 techniques and tools within an enterprise, paired with an increased use of services offered over the Web and with leaving more room for the individual and his preferences, that has led to the term Enterprise 2.0 (Vossen, 2009, p. 38). In other words, enterprises as well as software vendors are using it by integrating Web 2.0 features into their software, processes, and work environments (Vossen, 2009, p. 38).

Traditionally, business students are concerned with business applications of Web 2.0 techniques and technologies, namely, corporate blogs, wikis, feeds and podcasts (Vossen, 2009, p. 38). In turn, engineering students are associated with the infrastructure and functionality dimensions of Web 2.0. However, the employed approach of the present paper, namely, Web 2.0 on the path into the enterprise (Vossen, 2009, p. 38) in a broader social context than within business framework only, reveals all the Web 2.0 dimensions, namely, the infrastructure dimension, the functionality dimension, the data dimension, and the social (or socialization) dimension, to be contributing to engineering and business students’ enterprise.

The change in specialist entering the service area, namely, not working permanently at a large-scale enterprise but accepting project-related orders of large-scale enterprises by free engineers’ and entrepreneurs’ office (Bassus & Wolfgramm, 2009, p. 38) emphasizes the main pedagogical task that is not only about educating economically versed people able to make business miracles, but also about promoting students’ self-confidence and capability to cope with their own problems in all spheres of life in a knowledgeable and enterprising way, fostering students’ enterprise capability instead of entrepreneurship only while studying in different educational institutions (Oganisjana & Koke, 2008, p. 225).

Integration of Enterprise 2.0 into the processes and environments of engineering and business education has the potential to contribute decisively to the needs of student engineers and student entrepreneurs to become more cognizant and more responsive to the emerging needs of the market for engineering, enterprise and technology services. The search for the integration of Enterprise 2.0 of Web 2.0 techniques and technologies into engineering and business education emphasizes that the software programmes following the traditional stimulus-response model based on behaviourism, lead to the computers’ misuse (Trageton, 2010, p. 18). Hence, a proper integration of Enterprise 2.0 into engineering and business education is provided by needs analysis. However, the emphasis of the System-Constructivist Theory on the subjective aspect of the human being’s point of view and experience that plays the central role in a construction process does not allow analyzing the students’ needs objectively: human beings do not always realize their experience and their wants (Maslo, 2007, p. 38).

In accordance with the research methodology, namely, developing the system of the external and internal perspectives, needs analysis is revealed to be of three levels, namely, individual needs, organizational needs and professional needs. Regular analysis of students’ needs becomes a means of development of students’ use of Enterprise 2.0 (Lüka, 2008, p. 7). Thus, needs analysis has the potential to bridge the gap between the student engineers’ and entrepreneurs’ needs in Enterprise 2.0 (Oganisjana & Koke, 2008, p. 225).

Results and Discussion

This study is oriented towards the revealing of the student engineers’ and entrepreneurs’ view on the use of Enterprise 2.0 for individual, organizational and professional purposes in engineering and business education.

The present empirical study involves four independent samples, namely: (1) 22 participants of Fifth Baltic Summer School Technical Informatics and Information Technology at the Institute of
Computer Science of the Tartu University, August 7-22, 2009, Tartu, Estonia; (2) 40 bachelor students at the Department of Electrical Engineering and Computer Science of the Faculty of Engineering of Wismar University, University of Technology, Business and Design, Germany; (3) 22 bachelor students in Business Law at the Faculty of Business of Wismar University, University of Technology, Business and Design, Germany; and (4) 110 bachelor students in Business Management at the Faculty of Business of Wismar University, University of Technology, Business and Design, Germany.

All 22 participants of Fifth Baltic Summer School Technical Informatics and Information Technology have obtained Bachelor or Master Degree in different fields of Computer Sciences and working experience in different fields. The International Summer School offers special courses to support the internationalization of education and the cooperation among the universities of the Baltic Sea Region.

The aims of the Baltic Summer Schools Technical Informatics and Information Technology are determined as preparation for international Master and Ph.D. programs in Germany, further specialization in computer science and information technology and learning in a simulated environment.

The Summer School Technical Informatics and Information Technology contains a special module on Web 2.0 where Enterprise 2.0 is part. The module on Web 2.0 examines the advantages and problems of this technology, on namely, architecture and management, protocol design, and programming, which makes new social communication forms possible.

The 22 participants of Fifth Baltic Summer School Technical Informatics and Information Technology at University of Tartu Institute of Computer Science are with different cultural and upbringing backgrounds and with diverse educational approaches from different countries, namely, Latvia, Lithuania, Estonia, Russia, Great Britain, China, India, Nigeria, Romanian and Mexico. Whereas cultural similarity aids in the establishment of mutual understanding between people (Leontiev, as cited in Robbins, 2007, p. 55), the students’ different cultural and educational backgrounds contribute to successful learning and become an instrument in bringing the students together more closely under certain conditions, namely, appropriate materials, teaching/learning methods and forms, motivation and friendly attitude of the educator (Abasheva, 2010, p. 431).

Then, 40 students at the Department of Electrical Engineering and Computer Science at the Faculty of Engineering of Wismar University, University of Technology, Business and Design were taken into consideration at the beginning of the seventh semester in the fourth year of their bachelor studies. The students have not had any or few work experience. The seventh semester of the Bachelor’s program for Electrical Engineering and Computer Science at the Faculty of Engineering of Wismar University does not contain a special module on Web 2.0.

Finally, 22 bachelor students in Business Law and 110 bachelor students in Business Management at the Faculty of Business of Wismar University, University of Technology, Business and Design, Germany were taken into consideration at the beginning of the second semester in the first year of their bachelor studies. The bachelor students have not got any or few work experience. The second semester of the Bachelor’s program in Business Law and Management at the Faculty of Business of Wismar University does not contain a special module on Web 2.0.

The explorative method has been used in the research (Tashakkori & Teddlie, 2003; Mayring, Huber and Gurtler, 2004). The study consisted of the following stages: exploration of the contexts in use of Web 2.0 through thorough analysis of the documents, analysis of the students’ feedback regarding their needs, data processing, analysis and data interpretation (Kogler, 2007) and analysis of the results and elaboration of conclusions and hypothesis for further studies.

The views of student engineers and student entrepreneurs as prospective specialists on needs in Web 2.0 within engineering and business education are particularly important. Their views on needs in Web 2.0 within engineering and business education are considered through needs analysis. Needs of three levels, namely, individual needs, organizational needs and professional needs, are analyzed. Moreover, needs analysis serves as a basis for designing the following questionnaire (Surikova, 2007, p. 389):

- Question 1: Do you know the word Web 2.0?
• Question 2: Do you know the basic idea of Web 2.0?
• Question 3: Have you already used Web 2.0, namely, Facebook, Twitter, Wikipedia, etc?
• Question 4: Do you think Web 2.0 requires a lot of profound knowledge, namely, math, physics, etc?
• Question 5: Do you think Web 2.0 is useful for your individual needs?
• Question 6: Do you think Web 2.0 is useful for your organizational needs?
• Question 7: Do you think Web 2.0 is useful for your professional needs?

The evaluation scale of five levels for each question is given where “1” means “disagree” and low level of experience in the use of Enterprise 2.0 technologies and “5” means “agree” and high level of experience in the use of Enterprise 2.0 technologies.

The analysis of the surveys, as depicted in Figures 3-6, carried out with four independent samples, namely, 22 participants of Fifth Baltic Summer School, 40 student engineers, 22 bachelor students in Business Law and 110 bachelor students in Business Management, shows that the students’ views on the use of Enterprise 2.0 for individual, organizational and professional purposes are heterogeneous and that the student engineers and student entrepreneurs don't know the possibilities offered by Web 2.0 properly.

Figure 3. Probability Density Function (PDF) of the BaSoTi participants’ evaluation on August 7, 2009.
Figure 4. Probability Density Function (PDF) of the university student engineers’ evaluation in September 2009.

Figure 5. Probability Density Function (PDF) of the university Business Law Bachelor students’ evaluation in April 2010.
Figure 6. Probability Density Function (PDF) of the university Business Management Bachelor students’ evaluation in April 2010.

However, with the appropriate courses as shown by the BASOTI students, they are able to absorb the possibilities of the new technology easily.

Between Survey 1 and 2 of the participants’ experience in use of Web 2.0 within the Baltic Summer School Technical Informatics and Information Technology teaching/learning activity involved courses in Technical Informatics and Information Technology (German and English), preconference tutorials for introduction into advanced research topics, attendance of conference Advanced Topics in Telecommunication, tutorials and practical tasks, language training for talk and presentation (optional in English or German), leisure activities and social contacts as well as practical work at IT Company. Then, the analysis of the second survey (Figure 7) carried out within the Baltic Summer School Technical Informatics and Information Technology on August 11, 2009 reveals that the participants’ experience in use of Web 2.0 has become homogeneous, and the participants have put the emphasis on the use of Web 2.0 for professional needs.

After having implemented a variety of methods and forms of teaching/learning activity (Zaščerinska, 2009) the result summary of two surveys of the participants’ experience within the Baltic Summer School 2009 demonstrates the positive changes in comparison with Survey 1: the level of the participants’ experience in terms of the use of Web 2.0 has been enriched; the level of the participants’ experience in terms of knowledge of basic idea of Web 2.0 has been improved; the level of the participants’ experience in terms of the use of Web 2.0 for individual needs decreased, thereby developing the system of the external and internal perspectives; the level of the participants’ experience in terms of the use of Web 2.0 for organizational and professional needs increased, thereby developing the system of external and internal perspectives (Figure 1).
Figure 7. Probability Density Function (PDF) of the second BaSoTi participants’
evaluation on August 11, 2009.

Thus, the results’ comparison of Survey 1 and Survey 2 of the participants’ experience in the use
of Web 2.0 emphasizes the decrease of the number of participants who have obtained the low and critical
level of experience and the increase of the number of participants who have achieved the average and
optimal level of experience revealed by the levels of the participants’ experience in the use of Web 2.0.

Conclusion

The findings of the research allow the drawing of the conclusion that the student engineers’ and
entrepreneurs’ views on Enterprise 2.0 in engineering and business education are condition for successful
use of Enterprise 2.0 in acquiring engineer’s and entrepreneur’s profession. The results of the empirical
study within a multicultural environment reveal that the student engineers’ and entrepreneurs’ views on
the use of Enterprise 2.0 for individual, organizational and professional purposes are heterogeneous.
However, as shown by the Fifth Baltic Summer School, students are able to adopt new technologies and
gain benefits easily, which lead to new ways of socializing.
The emphasis of the System-Constructivist Theory on the subjective aspect of the human being’s point of
view and experience that plays the central role in a construction process does not allow analyzing student
engineers’ and student entrepreneurs’ needs in Enterprise 2.0 objectively: human beings do not always
realize their experience and their wants in Enterprise 2.0. The recommendation here is the role of
educators in engineering and business education at the tertiary level as mentors for the student engineer’s
and student entrepreneur’s self-discovery and self-realization; to motivate student engineers and student
entrepreneurs, to stimulate their interests, to help them develop their own structure and style, as well as to
help them evaluate their performance and be able to apply these findings (Maslo, 2007, p. 45) to improve
their further use of Enterprise 2.0.
The research results could be particularly useful for the educators in engineering and business education at the tertiary level who enable new specialists to act in a multicultural environment. The paradigm shift focusing from macro-cultures to micro-cultures (family culture, school culture, class culture, professional culture, gender culture, culture of interest groups, political groups/parties, generation) leads to a new perspective: people behave being influenced by identification with different groups, not only one group (Dirba, 2007, p. 102-103). Thus, all groups/classes are understood to be multicultural (Dirba, 2007, p. 103).

The present research has limitations. The use of Web 2.0 was studied paying attention to the students’ expressions regarding use of Web 2.0 in the Baltic Summer School, but it was studied in isolation from the work of other educators and their contribution. Another limitation is the length of the research. The results of the seventh and second semesters were analyzed but the full length of the Bachelor programmes in engineering and business education is eight semesters. If the results of the other semesters had been available for analysis, different results could have been attained. There is a possibility to continue the study.

The following hypothesis for further studies is brought forth: in order to develop the students’ view on Enterprise 2.0 in education, it is necessary to promote engineering and business students’ use of Enterprise 2.0 for organizational and professional purposes, as well as to create a favourable learning environment which supports learners’ needs and provides the successful use of Enterprise 2.0 in multicultural environment.

References


A Comparative Study of the Relationship between Social Dimension of Web 2.0 Technologies and E-learning: Students’ View in Germany and Taiwan

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Abstract
The social dimension of Web 2.0 penetrates our society more thoroughly with the availability of broadband services. Aim of the following paper is to analyze the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning within education. Research methodology is based on the theoretical findings on the social dimension of Web 2.0 (Vossen, 2009; Tapscott, Williams, 2006; Berners-Lee, 2000) and its relationship between social dimension of Web 2.0 technologies and e-learning (Maslo, 2007; Zaščerinška, 2009a). The present empirical research was conducted during the implementation of Bachelor’s programmes at the Faculty of Business and Engineering at Wismar University, University of Technology, Business and Design, Germany, and Taiwan. The comparative study results suggest that the students in Taiwan have a higher level of positive view on the relationship between social dimension than the engineering and business students of Wismar University in Germany. The findings of the research allow further studies in order to promote the students’ use of the social dimension of Web 2.0 for organizational and professional purposes, as well as to create a favourable learning environment which supports learners’ needs and provides successful e-learning within the social dimension of Web 2.0 in a multicultural environment.

Keywords: E-learning, social dimension of web 2.0 for individual, organizational and professional purposes
Background

Web 2.0 is jointly formed by four dimensions, namely, the infrastructure dimension, the functionality dimension, the data dimension, and the social (or socialization) dimension.

Socialization, described as taking software or even user-generated content and sharing or jointly using it with others, covers the aspect of user-generated content as it occurs in blogs or wikis, in tagging as well as in social bookmarking (Vossen, 2009, p. 38).

Skype, Classroom Management Systems, the eBay seller evaluation, the Amazon recommendation service, or Wikipedia (Vossen, 2009, p. 38), where the increased data exchange within the system is no longer a limiting parameter with the current developments in the infrastructure. These are classical examples and have found widespread acceptance in the community. The social dimension of Web 2.0 penetrates our society more thoroughly with the availability of broadband services. However, the success of the social dimension of Web 2.0 in education requires students’ view to be considered.

Aim of the following paper is to analyze the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning within education. The meaning of the key concept of social dimension of Web 2.0 is studied. Moreover, the study demonstrates how the key concept is related to the idea of e-learning. The study presents how the steps of the process are related: determining social dimension of Web 2.0 → revealing the relationship between social dimension of Web 2.0 technologies and e-learning → carrying out the empirical study within a multicultural environment.

The paper is organized as follows: The introductory state-of-the-art section demonstrates the authors’ position on the topic of the research. Section 3 introduces the social dimension of Web 2.0. The relationship between social dimension of Web 2.0 technologies and e-learning within education is studied in Section 4. The associated empirical results are presented and interpreted in Section 5. Finally, some concluding remarks are provided in Section 6.

State-of-the-Art

The modern issues of global developmental trends emphasize “a prime importance in sustainable development that is to meet the needs of the present without compromising the ability of future generations to meet their own needs” (Zimmermann, 2003, p. 9). Thus, sustainable personality, and, consequently, user of the social dimension of Web 2.0, is “a person who sees relationships and inter-relationships between nature, society and the economy” (Rohweder, 2007, p. 24). In other words, this is a person who is able to develop the system of external and internal perspectives, and in turn the system of external and internal perspectives becomes a main condition for the sustainable user of the social dimension of Web 2.0 to develop. For instance, the concern of the European Union, namely, to become “the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion” (European Commission, 2004, p. 2), demonstrates the significance of developing the system of external and internal perspectives for the development of humans, institutions and society. Thus, the life necessity to develop the system of two perspectives, namely, external and internal, determines the research methodology of the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning in education on the pedagogical discourse, as highlighted in Figure 1.

However, in real-life sustainable user of the social dimension of Web 2.0 is often realized from one of the perspectives: from the internal perspective accentuating cognition (Vossen, 2009), from the external perspective accentuating social interaction (Tapscott, Williams, 2006) and finding a balance between the external and internal perspectives (Surikova, 2007).

The methodological foundation of the present research on the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning is formed by the System-Constructivist Theory based on Parson’s system theory (Parson, 1976) where any activity is a system; Luhmann’s theory
which emphasizes communication as a system (Luhmann, 1988); the theory of symbolic interactionalism (Mead, 1973; Goffman, 2008) and the theory of subjectivism (Groeben, 1986). The system-constructivist approach to learning emphasizes that human being’s point of view depends on the subjective aspect (Maslo, 2007, p. 44): everyone has his/her own system of external and internal perspectives (Figure 1) that is a complex open system (Rudzinska, 2008, p. 366), and experience plays the central role in a construction process (Maslo, 2007, p. 42). Thus, four approaches to the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning are revealed, namely, from the internal perspective accentuating cognition, from the external perspective accentuating social interaction, finding a balance between the external and internal perspectives and developing the system of the external and internal perspectives. Therein, the fourth approach, namely, developing the system of external and internal perspectives, is considered to be applicable to the present research on the students’ view on the relationship between the social dimension of Web 2.0 technologies and e-learning.

Figure 1. Developing the system of external and internal perspectives as a life necessity

<table>
<thead>
<tr>
<th>External Perspectives as a Life Necessity</th>
<th>Internal Perspectives as a Life Necessity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• conscious</td>
<td>• unconscious</td>
</tr>
<tr>
<td>• learning</td>
<td>• acquisition</td>
</tr>
<tr>
<td>• foreign language</td>
<td>• mother tongue</td>
</tr>
<tr>
<td>• systematic</td>
<td>• non-systematic</td>
</tr>
<tr>
<td>• from abstract to concrete</td>
<td>• from concrete to abstract</td>
</tr>
<tr>
<td>• thought generalization</td>
<td>• object generalization</td>
</tr>
</tbody>
</table>

Social Dimension of Web 2.0

The paradigm change, namely, the move towards mass collaboration (Tapscott & Williams, 2006) and/or mass socialization (Vossen, 2009, p. 38) – from person to people and from systems to service (Jones, 2008), puts the emphasis on the use of the social dimension of Web 2.0.

Typical social dimension of Web 2.0 techniques and technologies include “social software” and online social networks (Vossen, 2009, p. 38-39).

“Social software” is defined by Vossen (Vossen, 2009, p. 38) as software that gets better (or at least more useful), the more people use it. While most of the time the software itself, i.e., the program system, does not change based on the number of its users or the frequency with which it is used, it is the application that the software is enabling. Examples include Skype, the eBay seller evaluation, the Amazon recommendation service or Wikipedia. Especially the latter is a perfect example for what so-
called mass collaboration (Tapscott & Williams, 2006) or crowd-sourcing can achieve. There is also another impact that socialization can have, namely, that of improving some given software on a constant or perpetual basis. Traditionally, software has never been free of bugs, security holes, or errors, and it has been common for a software company to fix them and distribute new releases or versions of the software from time to time. The new approach is to do this at a much higher pace. Software on the Web may nowadays be in a permanent beta state of release and never finished. Thus, for outsiders maintenance occurs on a permanent basis. Such a state of perpetual beta may apply to a service that can only be accessed through an API (Application Programming Interface), in which case, a user is not bothered by constant release changes, at least as long as the behaviour of the API is only extended, but not fundamentally modified.

Then, Vossen (2009, p. 38) considers that online social networks, another form of mass socialization today, bring a dimension to the Web that goes beyond simple links between pages. They add links between people and between communities. In such a network, direct links will typically point to our closest friends and colleagues, while indirect links lead to the friends of a friend, and others.

A social network on the Web is typically the result of employing some software that is intended to focus on building an online community for a specific purpose. Social networks connect people with common interests and may be as simple as a blog, or as complex as Facebook or MySpace for most private applications, as LinkedIn or Xing for professional applications, or as Twitter for both. The primary impact that the current Web developments are having in this area is connecting people and communities constantly becomes easier, and it is not difficult anymore to maintain a professional or personal network of buddies worldwide. Yet another impact is that a social network may open up novel sources of revenue, in particular through advertising. Finally, Vossen (2009, p. 38) underlines that two aspects should have become clear by the discussion so far. On the one hand, the most obvious change that has recently occurred on the Web is that it has changed from a pure read Web as designed by Berners-Lee (2000) to a read/write Web, where users not only draw information from, but also add information to it. On the other hand, the dimensions we have discussed exhibit various overlaps. Indeed, technology enables functionality, which as a “by-product” leads to data collections, and users have a new tendency to socialize over the Web, by exploiting that functionality and the technology.

Hence, social dimension of Web 2.0 techniques and technologies, namely, “social software” and online social networks, are considered as an integral part of education.

The Relationship between Social Dimension of Web 2.0 and e-Learning

The change in specialist entering the service area, namely, not working permanently at a large-scale enterprise but accepting project-related orders of large-scale enterprises by free office (Bassus & Wolfgramm, 2009, p. 38) reveals the significance of the relationship between social dimension of Web 2.0 technologies and e-learning in the processes and environments of education.

Developing the idea of Vossen (2009, p. 38) on the use of Facebook or MySpace for private applications, and LinkedIn or Xing for professional applications, or Twitter for both, use of the social dimension of Web 2.0 is differentiated into the use of the social dimension of Web 2.0 for individual purposes, for organizational purposes and for professional purposes as shown in Figure 2.
A proper use of the social dimension of Web 2.0 for individual, organizational and professional purposes is provided by e-learning in education based on the idea that all learning is part of a single process, an on-going process (Maslo, 2007, p.38). This finding suggests that e-learning is a part of a single learning process within education.

Hence, the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning has the potential to contribute decisively to the sustainable use of social dimension of Web 2.0 technologies for individual, organizational and professional purposes in education.

**Results and Discussion**

This study is oriented towards the revealing of the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning whereas the research objectives were to analyze the relationships among the degree of involvement and e-learning capabilities while using Web 2.0 technologies to improve the learners’ competences and learning outcomes.

The present empirical research was conducted during the implementation of Bachelor’s programmes at the Faculty of Business and Engineering of Wismar University, University of Technology, Business and Design, Germany, and the nationwide of Taiwan.

The present empirical study involves three independent samples, namely: (1) 40 bachelor students in Electrical Engineering at the Faculty of Engineering of Wismar University, University of Technology, Business and Design; (2) 120 bachelor students in Business Law at the Faculty of Business of Wismar University, University of Technology, Business and Design, Germany; and (3) 193 undergraduate students of the nationwide of Taiwan.
The 193 undergraduate students of the nationwide of Taiwan were asked to complete the questionnaire. The Bachelor’s programmes do not contain a special module on Web 2.0.

Then, 40 students at the Department of Electrical Engineering and Computer Science at the Faculty of Engineering of Wismar University, University of Technology, Business and Design were taken into consideration at the beginning of the seventh semester in the fourth year of their bachelor studies. The students have not got any or few work experience. The seventh semester of the Bachelor’s program for Electrical Engineering and Computer Science at the Faculty of Engineering of Wismar University does not contain a special module on Web 2.0.

Finally, 120 bachelor students in Business Law at the Faculty of Business of Wismar University, University of Technology, Business and Design, Germany were taken into consideration at the beginning of the second semester in the first year of their bachelor studies. The bachelor students have not got any or few work experience. The second semester of the Bachelor’s program in Business Law and Management at the Faculty of Business of Wismar University does not contain a special module on Web 2.0.

Analysis of the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning are based on the following questionnaire where the e-learning ability was taken into account for further evaluation:

• Question 1: Are you interested in e-learning?
• Question 2: Are you actively participating in e-learning activities?
• Question 3: Do you think you can learn easily by using e-learning?
• Question 4: Do you believe that the knowledge and skills you acquired through e-learning can increase the efficiency of problem solving?
• Question 5: Can you effectively integrate the knowledge and skills you acquired from e-learning?
• Question 6: Can you use the knowledge acquired from e-learning on problem solving efficiently?

The evaluation scale of seven levels for each question is given where “1” means “strongly disagree” and low level of experience in the use of social dimension of Web 2.0 technologies and “7” points out “strongly agree” and high level of the use of the social dimension of Web 2.0.

The survey of the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning by the students in Germany, highlighted in Table 1, reveals the following: The use of the social dimension of Web 2.0 by students is homogeneous, as well as the students do not realize the possibilities offered by Web 2.0 properly.

<table>
<thead>
<tr>
<th>Question</th>
<th>Engineering Students</th>
<th>Business Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>1</td>
<td>4.46</td>
<td>1.630</td>
</tr>
<tr>
<td>2</td>
<td>3.54</td>
<td>1.860</td>
</tr>
<tr>
<td>3</td>
<td>3.96</td>
<td>1.661</td>
</tr>
<tr>
<td>4</td>
<td>3.62</td>
<td>1.675</td>
</tr>
<tr>
<td>5</td>
<td>3.73</td>
<td>1.564</td>
</tr>
<tr>
<td>6</td>
<td>3.62</td>
<td>1.416</td>
</tr>
<tr>
<td>Total</td>
<td><strong>3.8</strong></td>
<td><strong>1.416</strong></td>
</tr>
</tbody>
</table>
The survey of the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning by the students in Taiwan, emphasized in Table 2, reveals that the use of the social dimension of Web 2.0 by students is homogeneous as well as the students do not realize the possibilities offered by Web 2.0 properly.

Table 2
Statistical analysis of the questionnaires obtained from the students in Taiwan

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.21</td>
<td>0.959</td>
</tr>
<tr>
<td>2</td>
<td>4.40</td>
<td>1.070</td>
</tr>
<tr>
<td>3</td>
<td>4.30</td>
<td>0.996</td>
</tr>
<tr>
<td>4</td>
<td>4.39</td>
<td>1.182</td>
</tr>
<tr>
<td>5</td>
<td>4.51</td>
<td>0.954</td>
</tr>
<tr>
<td>6</td>
<td>4.70</td>
<td>1.310</td>
</tr>
<tr>
<td>Total</td>
<td>4.4</td>
<td></td>
</tr>
</tbody>
</table>

The survey of the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning by the students in Germany and in Taiwan, emphasized in Table 3, reveals that the use of the social dimension of Web 2.0 by students is heterogeneous as well as the students do not realize the possibilities offered by Web 2.0 properly.

Table 3
Mean analysis of the questionnaires obtained from the students of Wismar University and of the nationwide of Taiwan

<table>
<thead>
<tr>
<th>Question</th>
<th>Students of Wismar University</th>
<th>Students of the nationwide of Taiwan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.74</td>
<td>4.21</td>
</tr>
<tr>
<td>2</td>
<td>3.96</td>
<td>4.40</td>
</tr>
<tr>
<td>3</td>
<td>3.66</td>
<td>4.30</td>
</tr>
<tr>
<td>4</td>
<td>3.54</td>
<td>4.39</td>
</tr>
<tr>
<td>5</td>
<td>3.63</td>
<td>4.51</td>
</tr>
<tr>
<td>6</td>
<td>3.51</td>
<td>4.70</td>
</tr>
<tr>
<td>Total</td>
<td>3.8</td>
<td>4.4</td>
</tr>
</tbody>
</table>

The comparison of the Mean value (Mean) shows that the engineering and business students of Wismar University demonstrate the homogeneous view (Mean value – 3.8 and 3.9) on the relationship between social dimension of Web 2.0 technologies and e-learning. The students in Taiwan have a higher level of the positive view (Mean value – 4.4) on the relationship between social dimension of Web 2.0 technologies and e-learning than the engineering and business students (Mean value – 3.8) of Wismar University in Germany.

The comparison of the Standard Deviation (Std. Deviation) results reveals that the scores of the engineering and business students of Wismar University in Germany are wider than the scores of the students in Taiwan.

Hence, the results of Mean and Standard Deviation within the survey of the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning in Germany and Taiwan
reveals that most of answers are concentrated around Level 3 and 4 that means “agree”. Thus, there is a possibility to increase the students’ e-learning within the social dimension of Web 2.0.

Processing, analysis and interpretation of data gathered from the survey of the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning in the course of the present research emphasize that the students’ view on the relationship between social dimension of Web 2.0 technologies and e-learning contributes to the use of social dimension of Web 2.0 by the students in education.

Conclusion

The findings of the research allow putting forth the following hypothesis for further studies: in order to increase the students’ e-learning within the social dimension of Web 2.0 it is necessary to promote students’ use of the social dimension of Web 2.0 for organizational and professional purposes, as well as to create a favourable learning environment which supports learners’ needs and provides successful e-learning within the social dimension of Web 2.0 in a multi-cultural environment. The recommendation here is the role of educators as mentors for student self-discovery and self-realization; to motivate students, to stimulate their interests, to help them develop their own structure and style, as well as to help them to evaluate their performance and be able to apply these findings (Maslo, 2007, p. 45) to improve their futher use of the social dimension of Web 2.0. The solution here to process, analyze and interpret gathered data objectively is to improve the questionnaire, to triangulate the methods of gathering data, i.e. students’ educator evaluation and other educator evaluation, to evaluate the dynamics of each student in the sample and to apply a variety of statistics tests. The recommendation here for an objective analysis is the role of educators as researchers (Zaščerinska, 2009b, p. 78) that is to develop continuously educators’ experience in social interaction and cognitive activities.

References


Success Indicators for Managing ICT Systems for e-Governance Initiatives

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Abstract

Management provides the essential link between Information and Communication Technology (ICT) and the operating environment surrounding it. Unable to create a supportive environment, chances of ICT failure are high. This paper examines documented cases of successful ICT operations of economically developing and developed countries, considered as “best practices” by ICT experts and World Bank case writers. Adopting a “design-reality gaps” model, it identifies similarities and differences in the design and implementation of their ICT systems, and the outcomes resulting from their operation, in view of possible threats of failure. By implying what the outcomes may logically suggest, it draws out possible guidelines, in the form of policies for planning and implementing successful ICT projects. These policies, in turn, shall serve as indicators of success and as key strategic inputs for developing e-Governance initiatives with high chances of success.

Keywords: e-Governance, reality-design gaps, best practices
Background

Public service usually entails three major concepts: democracy, governance, and people. Democracy allows the participation of citizens in the affairs of government. Governance is the utilization of political power in order to implement laws, programs, and projects. The object of a democratic government is the people. It is essential that the three elements interact between each other to facilitate, improve, or innovate, the delivery of public services. However, in many instances, public service is casually dispensed with as mere token, especially in developing countries.

Public sector agencies integrate Information and Communication Technology (ICT) into their administrative systems to enhance public service delivery. They believe that if properly designed and managed, ICT is capable of creating the necessary environment for inciting interaction among the three elements. Public administrators, especially in developing countries, call this process “e-Governance”. Developing and implementing ICT projects for successful e-Governance initiatives should therefore strategically address, from the outset, the triangular interaction platform of public service. An e-governance aligned ICT system enhances the delivery of public service.

The term “ICT” and “IT” are similar in concept. As to scope, ICT is globalized whereas IT is localized. As to function, IT is used for processing information for decision-makers and clients (e.g., MIS, DSS systems) whereas ICT distributes processed information on a global scale (e.g., Internet, WorldWideWeb, e-mail, voip, video-conferencing).

The term “e-Governance” is commonly used in most developing countries whereas “e-Government” is commonly used in developed countries (notably North America). e-Government refers chiefly to the electronic processing of information for management and strategic decision-making activities. e-Governance refers to integrating ICT systems into the activities of government agencies that would make them more transparent, participative, predictive, and accountable. Both terms are similar in concept but differ only in design and purpose of use. In this paper, both terms convey the same meaning.

This paper examines documented cases of successful ICT operations of economically developing and developed countries, considered as “best practices” by ICT experts and World Bank case writers. Adopting a “design-reality gaps” model, it identifies similarities and differences in the design and implementation of their ICT systems and the outcomes resulting from the operation of their ICT projects, in view of possible threats of failure. By implying what the outcomes suggest, it draws out possible policies for planning and implementing successful ICT projects. These policies, in turn, shall serve as indicators of success and as key strategic inputs for developing e-Governance initiatives with high chances of success.

Discussion

Success and Failure in e-Governance

With the coming of the information age, precipitated by the technological fusion of electronic communication systems with information technology (IT) systems from which ICT resulted, the application of ICT in various fields of public endeavor became irresistible. In the sphere of government action, ICT is increasingly being applied especially in developing countries in support of their administrative processes and service delivery. Among the outcomes are: reduced cost of operation, improved delivery of public service, and increased people’s participation. These events led to the emergence of the concept of e-Governance.

However, Heeks’ (2003, p. 2) analysis of more than 40 e-Government cases of developing or transitional governments, and of a survey of experts of the e-Government for Development Information...
Exchange (eGDIE), observed that 33% of the e-Government projects undertaken in these countries were total failures; 50% partial failures; and only 15% successes.

Total and partial failures suggest that developing countries may have the ICT design and implementing plans readied, to be fair at least, but actual implementation did not work out as planned; or if it worked, the outcome was dysfunctional. The high cost involved in ICT projects that failed in this context is catastrophic to poor countries.

To understand such failures and successes in e-Government initiatives, Heeks (2003) explained that a gap exists between current realities of the ICT environment on one hand, and the design of the e-Government project, on the other. The explanation is illustrated in the model below:

Figure 1. Heeks’ Design-Reality Gap
The current reality column on the left side depicts the preferences of decision makers for each of the seven dimensions, while the design of the e-Governance system reflects information requirements of the organization. The four dimensions beginning at the top (except technology) are a comparison of values of the decision-makers whereas the next three dimensions (including technology) are a comparison between organizational realities and the requirements of the information system. Heeks (2003, p. 4) describes four of the dimensions, by giving an example of each below:

**Information:** design of formal channels of information; reality, decision makers prefer informal information channels and gut feelings;

**Process:** design of organization guides for structured decision-making; reality, stakeholders prefer personal, politicized, free-wheeling decision-making;

**Objectives and Values:** design a rules platform to change management behavior of stakeholders; reality, stakeholders prefer platform to allow self-interest and hidden agenda; and

**Management Systems and Structures:** design for hierarchical structures for decision-making; reality, the support is non-existent.

Heeks (2003, p. 6) describes the staffing and skills dimension as a comparison between the current organizational realities and requirements of the information system in terms of staffing numbers and skill levels and types; the technology dimension, in terms of specific hardware, software, and other requirements contained in the design of the information system; and the other resources dimension, in terms of time and money to implement and operate the information system successfully.

The wider the gap, according to Heeks (2003, p. 3), the probability of failure is high and the narrower the gap, the probability of success is high. He observes that failures actually occur in situations where the gaps are quite large. The types of failures come in various forms, but three emerged as dominant. These are: (1) hard-soft gaps: the soft factors of people, politics, emotions, and culture but dominate the hard ideas about the bureaucratic purpose of ICT, and for which failures are certain; (2) private-public gaps: based on the notion that public and private are fundamentally different and the likelihood of public agencies to adopt private sector-designed ICT systems, and for which failures are numerous; and (3) country-context gaps: wherein a developing country imports and adopts an ICT system designed for a developed country, and for which partial or total failures often follows (Heeks, 2003, p. 5).

Heeks’ explanation about the size of gaps in each dimension suggests that on a per country basis, the sizes come in different interval measures as a result of varying degrees of influence by their unique political, economical, and social environments. Logically, the “one-size, fits all” development model cannot be applied in instances where developing countries, as is usually the case, request international donors, most of whom come from developed countries, for the adoption and use of the latter’s ready-made ICT models into their current administrative mechanisms. Such a concern is understandable, considering the substantial investments in ICT infrastructure that developing governments should provide. On the contrary, initial examination on documented ICT application in the Philippines countered such drawback with encouraging results. The Philippines was hard-pressed in allocating budget support to the ICT project in the Bureau of Customs. The agency overcame the problem by initiating government-private sector-international donor cooperation for funding and implementing its ICT project.

Taking into account differences in environment conditions, neither a “one best way” approach is apparently available for developing countries wishing to fast-track e-Governance initiatives using donor-designed ICT models. In fact, e-Government experts (World Bank, 2006) contend that no single model of best practices for a successful e-Governance institutional structure is yet available, although they recognized some key principles considered essential to the management of ICT systems. ICT design and implementation must be based on country specifics to attain successful e-Governance initiatives.

For example, initial examination of documented ICT practices shows that even small island countries, like Mauritius, and small state governments, such as Bahia in Brazil, embraced ICT and benefited from its application. Chile, on the other hand, with its vastly untapped natural resources yet
poverty-stricken condition, also joined the bandwagon and emerged successful. Despite the differences in ICT models for e-Governance initiatives, territorial size, and economic conditions, these countries came out winners in pursuit of their e-Governance initiatives. These situations suggest that the decision to developing and/or innovating ICT for successful e-Governance initiatives are not an exclusive privilege of economically developed countries.

In view of the peculiarities attributable to country specifics, the study chose to examine documented cases of six (6) successful ICT experiences of countries, both rich and poor alike, from among case studies of ICT “best practices” compiled by the World Bank. These include the economically developed countries of Singapore and China (focusing on Beijing), as well as the economically developing countries of Mauritius, Brazil (focusing on Bahia), Chile, and the Philippines. The reasons for selecting these countries are explained in the following section.

A Tailor-made” Approach to Managing ICT

ICT offers endless opportunities to prevent such ICT failures identified by Heeks (2003) by exploring practical ways to bridge or narrow the “design-reality” gap. As no “one-size, fits all” design or “one best way” approach to developing a successful ICT system for e-Governance initiative has evolved in developing countries, a “tailor-made” approach appears likely to be the only rule at present.

The World Bank, which provides development assistance to its clients, chooses to document these “country-specific” ICT experiences, in the hope of identifying similarities or dissimilarities in ICT design, development, and implementing approaches. It shares these documented cases with other recipient countries having similar ICT environments as guides for developing and implementing ICT projects. In the end, adopting where applicable the ICT strategies of successful countries, it believes that the likelihood of ICT failures could be lessened. The Bank as well as other donor institutions considered such laudable achievements in ICT development and implementation as “best practices.”

The need for these donor agencies to continue documenting successful experiences in as many countries is because of the fact that ICT offers many possible answers to as many governance objectives as can be possibly imagined. In fact, the World Bank is in the forefront of promoting these ICT “best practices” for the whole world to notice because of its tremendous impact on its investment activities in developing countries. According to Bhatia (2005), more than 50% of the Bank’s projects require huge investments in ICT, and most of the ICT components are designed for e-Governance initiatives. Information containing such specific experiences and “real-life” situations provide meaningful insights on how leaders of government, business, and the citizenry may influence the outcome of their e-Governance initiatives. Thus, in the absence of a “one-size, fits all” ICT solution, using “best practices” for evaluating the probability of success in e-Governance initiatives becomes an acceptable and logically sound approach.

Outcomes of Agency e-Governance Initiatives

The table below shows a comparison of the various ICT designs and uses of each of the country cases, categorized according to outcomes:
### Table 1
Comparison of ICT Design and Use of Cases Across Outcomes

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Salvador, Chile (Government procurement E-system)</th>
<th>Bahia, Brazil (Citizen Assistance Service Centers in Bahia)</th>
<th>Mauritius (Contributions Network Project)</th>
<th>Manila, Philippines (Customs Reform)</th>
<th>Beijing, China (Beijing’s Business e-Park)</th>
<th>Singapore (Modernizing tax administration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact on access to Information</td>
<td>• citizen-oriented information handling via G2B-B2G concept</td>
<td>• easier securing of government documents and easier access to information, via a mobile “hub and spokes” concept</td>
<td>• a single, integrated “online” payment and validation of ITR and employer/employee contributions for timely filing by firms</td>
<td>• more accurate information handling, via “paperless” system, allowing easier monitoring of a larger number of shipments by a limited enforcement capability/resources</td>
<td>• common administrative platform connecting all government departments for handling of a variety of information for a G2B and G2C function</td>
<td>• instant retrieving of taxpayers information for integrated tax computation and payment via a “paperless” imaging system</td>
</tr>
<tr>
<td>Impact of ICT system on agency operations</td>
<td>• 24/7 operation and without censorship</td>
<td>• processing of business permits via Internet within one day;</td>
<td>• lesser work backlog; • lesser work pressure at peak periods; • smoother processing of documents; • automatic computation of payment breakdowns</td>
<td>• faster processing of clearances; • easier monitoring of banks that failed to remit collections; • reduced cargo releasing time from 8 days to between 4 hrs to 2 days; • reduced time in reconciliation of payments between banks and national treasury; • faster and more comfortable mode of paying customs duties through banks; • payment reconciliation between banks and payment remittance to National Treasury done from 4 months to one day</td>
<td>• work simplified for government • “7/24” mode of service, anywhere, to anyone; • reduced turnaround time from 2-3 months to 10-15 days on average for processing of government approval; • facilitated data management and control</td>
<td>• improved feedback on tax assessments of taxpayers from 12-18 months to 3-5 months</td>
</tr>
<tr>
<td>Impact on organization/agency benefits/costs</td>
<td>• increased transparency and accountability, reducing opportunities for corruption; • reduced transaction costs; • increased opportunities for feedback and cooperation between firms and public agencies</td>
<td>• reduced overhead expenses from previously rented properties/spaces</td>
<td>• improved cash flow control for clients; • energy cost saved in records reconciliation; • improved cash flow controls for government</td>
<td>• transparent processing and commenting of business permits, and in many government processes; • established two-way channel of communication between client and government; • eliminated redundant work (e.g., registration per department) • all manual data replaced by digital data; • non-physical transaction and information access reduced</td>
<td>• automated preparation of simple cases of tax assessments to 80%</td>
<td>• reduced staff turnover; • reduced tax appeals; • strengthened audit functions; • property valuations up-to-date; • completely re-engaged administrative processes/controls and information processing</td>
</tr>
<tr>
<td>Impact on Client/ Customer</td>
<td>• improved investment trust on government</td>
<td>• (89%) of clients rated the service as excellent</td>
<td>• government, business, and citizenry enjoy the convenience of customs processing</td>
<td>• some companies were relieved of their problems</td>
<td>• individual and corporate taxpayers satisfied with tax services</td>
<td>-</td>
</tr>
</tbody>
</table>
Impact on access to information.

An outcome that characterizes the information dimension of the design-reality gaps model. All country cases use the Internet platform to download, upload, and retrieve information, vis-à-vis citizens. However, the cases differ in the outcome of ICT use. Mauritius, Beijing, and Singapore implied an “integrated” access to information; Chile and the Philippines, a “selective” access. Brazil, however, implied a “universal” access. The differences in design and use in terms of agency and clientele access may be attributable to differing objectives of each of the cases. These differences may explain how the cases close the gap between respective end-user environment realities and ICT design for information access.

Impact on agency operations.

An outcome that characterizes the management systems and structures dimension of the design-reality gaps model. All cases exhibited similar outcomes in providing service; that is, to improve efficiency of operations. Efficiency in these cases was commonly expressed as either speeding up or reducing time for work operations, or reducing client transaction time and effort. Moreover, the ICT operations of Chile and Beijing not only imply efficiency as value but also effectiveness because both systems run on a “24/7” basis. These similarities/differences may also explain how the cases close the gap between their management systems and structures realities and ICT design for service delivery.

Impact on organization/agency benefits/costs.

An outcome that characterizes the objectives and values dimension of the design-reality gaps model. The ICT systems of all cases show both similarities and differences in outcomes. As to cost of agency operation, the objectives/values put into the design of the ICT systems of most cases point toward a reduction in overhead, operating, and energy costs. As to benefits accruing from agency operations, differences between each of the cases are observed. The outcomes of Chile, Philippines, and Beijing showed transparency and accountability. The outcomes of Mauritius and the Philippines showed improved cash flow or revenue generation. The outcomes of Singapore and the Philippines showed strengthening of audit and reconciliation structures. The outcome of Beijing was extended to show a reduction in traffic congestion. These similarities/differences in outcomes may explain how the cases close the gap between the objectives/values realities and ICT design for efficient/effective operation.

Impact on the client/customer.

An outcome that reflects the staffing and skills dimension of the design-reality gaps model. The outcome of the delivery of ICT services to intended beneficiaries of all the cases showed similar expressions of satisfaction in Chile and Singapore. Although not explicitly mentioned in the other cases, the increased benefits and reduced cost as outcomes certainly draw positive reactions from workforce and intended clients. These similarities in outcomes may explain how the cases close the gap between the staffing and skills realities and ICT design for meeting customer needs.

Policies in Managing Agency ICT Systems for e-Governance

The table below shows a comparison of the various management approaches associated with implementing ICT systems of the cases, categorized in the form of guidelines or policies. These policies are extracted from an analysis of the various outcomes of ICT systems in Table 1. These policies serve as inputs to developing and implementing e-Governance initiatives.
### Table 2
Comparison of Policies between Country Cases

<table>
<thead>
<tr>
<th>Policies</th>
<th>Salvador, Chile (Government procurement E-system)</th>
<th>Bahia, Brazil (Citizens Assistance Service Centers in Bahia-SAC)</th>
<th>Mauritius (Contributions Network Project - CNP)</th>
<th>Manila, Philippines (Customs Reform)</th>
<th>Beijing, China (Beijing’s Business e-Park)</th>
<th>Singapore (Modernizing tax administration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draw participation, support, and commitment of government, institutions, business, and citizens</td>
<td>sought support from political parties, interest groups, private sector advocates, and IT companies; 12 public agencies participated in design, development, and testing of the project</td>
<td>Secured participation of related agencies through strong pressure from the Government</td>
<td>Demonstrated government commitment to better services and encouraged all participants to actively engage in comment on, and contributions to the project</td>
<td>Source: <a href="http://www.worldbank.org">www.worldbank.org</a></td>
<td>Strong support of political leaders, dedicated and skilled managers</td>
<td></td>
</tr>
<tr>
<td>Establish linkages with other sectors and institutions</td>
<td>created partnership with public agency handling trade and investment in Chile through modernization activities</td>
<td>29 different service agencies participated in the SAC system</td>
<td></td>
<td></td>
<td>Long-term goal is to link ICT with various government agencies related to earnings, eligible deductions, etc.</td>
<td></td>
</tr>
<tr>
<td>Structure/restructure, e-engineer administrative framework/environment to fit ICT system</td>
<td>reduced the government purchasing office (DME) to a smaller agency to supervise the system, and related functions</td>
<td>quality and efficiency of government services less dependent on back-end engineering</td>
<td></td>
<td></td>
<td>Administrative structures and related processes of organizational control completely re-engineered;</td>
<td></td>
</tr>
<tr>
<td>Adopt a phased, calibrated, and deliberate implementation of ICT systems</td>
<td>adopted a slow implementation of programs; adopted a deliberate, step-by-step implementation of programs to monitor shortfalls in the early stages of the project</td>
<td>the contributions network project (CNP) was implemented in four (4) phases, due to its complexity</td>
<td></td>
<td></td>
<td>Internal procedures for taxpayer information processing completely re-engineered</td>
<td></td>
</tr>
<tr>
<td>Attention to capability-building of ICT managers and personnel</td>
<td>easier to hire and train new workers for new tasks than introducing a totally new culture and work ethic to existing personnel; adoption of positive and open view about new systems being introduced to enable adoption of results -oriented approaches</td>
<td>adopted gradual connectivity, starting with 30 employers, for easier handing of changes within a small group and gradual build-up of trust in the system</td>
<td></td>
<td></td>
<td>ICT system implemented and monitored in phases, accounting client feedback before going to the next phase</td>
<td></td>
</tr>
<tr>
<td>ICT system should be flexible, secured, expandable, compatible, and standardized for targeted users</td>
<td>adopted a standard, trusted, and tested software which ensured simplified processing, rather than creating a new one; used a data warehouse (FINLINK) for analysis and linking revenue departments</td>
<td></td>
<td></td>
<td></td>
<td>Established available pool of dedicated and skilled managers and personnel</td>
<td></td>
</tr>
<tr>
<td>Address customer satisfaction in ICT planning</td>
<td>design and implementation of SAC addressed customer satisfaction</td>
<td></td>
<td></td>
<td></td>
<td>Developed and implemented strategic business plans</td>
<td></td>
</tr>
</tbody>
</table>

Source: www.worldbank.org
Policy for drawing participation, support, and commitment from all concerned.

In terms of participation, mostly public and private agencies were closely involved even to the extent being pressured by their own governments. In terms of support, heads of government, political parties, interest groups, group advocacies, and IT companies were sought by the projects. In terms of commitment, heads of government and political leaders were specifically sought by the projects. To close the gap between the realities of their administrative structures and ICT management systems/structures design, the projects either required their government to actively demonstrate its commitment through shared-visioning, confidence-building, workshops, and awareness programs. Or worse, resort to strong pressure from head of government to elicit participation as in the case of Brazil. Specifically, the gap that existed in the case of Brazil is a “hard-soft” gap.

Policy to establish linkages with other agencies or institutions.

The projects linked with foreign and local institutions, in business or in education, including public/government agencies, either through partnerships or for business and academic purposes. Impliedly, the gap that existed in the case of Brazil is a combination of “hard-soft” and “public-private” gaps, as it secured in the process the participation of 29 different agencies, which may be public or private in nature.

Policy to fit administrative structures to planned ICT system.

The projects downsized agencies primarily responsible in operating the ICT system, build a common or integrated administrative structure, re-engineer control procedures, or outsourced its operation and maintenance, in order to achieve the objectives/purposes of their ICT systems. To close the gap between the realities of their management systems/administrative structures and ICT management systems/structures design, or pass or amend legislation to operate their ICT systems, or either create or abolish to prevent political and bureaucratic resistance as in the case of Chile. The gap that existed in the case of Chile is a combination of “hard-soft” and “public-private” gaps.

Policy to adopt a phased and incremental implementation of ICT system.

Most of the projects adopted a step-by-step implementation process to monitor shortfalls, to overcome design complexity and connectivity, to provide client feedback at every stage, for easier handling of personnel movement, and gradual build-up of trust in their ICT systems. These approaches were undertaken perhaps to close the gap between their organizational realities of management systems and structures and ICT management systems and structures design.

Policy on capability-building of ICT personnel and mindset-building of the public.

The projects of Brazil and Beijing saw the importance of orienting, training and retraining of personnel, and developing a technology mindset whereas Singapore saw the importance of establishing an available pool of dedicated and skilled staff. These approaches were undertaken perhaps to close the gap between their organizational realities of staffing and skills and ICT design for staffing skills and customers, in order to change old habits, adopt a results-oriented approach, adopt some other policy of hiring and training new employees than training existing personnel. The gap that existed in the case of Beijing and Singapore is a “hard-soft” gap.
Policy on flexibility, expandability, compatibility, and standardization in the design of ICT system.

The project of the Philippines adopted standardized software to simplify processes and connected to a data warehouse for securing its ICT system, perhaps to close the gap between its organizational realities of technology and ICT technology design. The gap that existed in the case of the Philippines is a “country-context” gap. However, the Philippines did not accept “hook, line, and sinker” the standard software developed by UNCTAD as it modified it in the process to suit its ICT system. The project of Beijing, on the other hand, included flexibility into the ICT system to address expanding environment and needs of clients, perhaps to close the gap between its organizational realities of objectives and values and ICT objectives and values design.

Policy on addressing customer satisfaction.

The project of Brazil emphasized customer satisfaction into its ICT plans whereas the projects of Philippines and Singapore developed and implemented strategic business plans for which customer satisfaction may be an implied component.

Findings on Emerging Outcomes and Policies

An examination of the similarities/differences in the outcomes of the ICT systems of all the cases, the following are found to be evident:
1. Of the seven dimensions of Heeks design-reality gaps, only four (4) are exemplified in the outcomes of all country cases. These are information, management systems and structures, objectives and values, as well as staffing and skills. The other three dimensions (processes, technology, and other resources) were not exemplified as information on experiences relative to these dimensions was scant or absent in all the cases. In the area of technology, for example, the case of the Philippines only mentioned the brand and developer of the software package.
2. As to user-access to information, all cases adopt a combination of the government-to-business and government-to-consumer (G2B and G2C) transaction systems.
3. As to agency operations, only two common objectives were apparently pursued: (1) efficient delivery of services, denominated by a reduction in processing time and effort; and effective delivery of services, through transparent and responsible ways as well as through extended operations (24/7 basis).

An examination of the similarities/differences in the policies of the ICT systems of all the country cases, the following are found to be evident:
1. On the whole, the seven dimensions of the design-reality gaps were generally addressed, but exemplified in different or similar approaches by at least one of the cases.
2. The cases also exemplified specific gaps area which appears to be both wide and narrow at both ends of the design-reality continuum (e.g., getting the support of public/private agencies and restructuring of the organizations and establish connection with one agency for data storage, respectively).
3. Most of the gaps exemplified in the cases are combination of the “hard-soft” and “private-public” gaps.
Success Variables for e-Governance Initiatives

The analyses presented in Tables 1 and 2 suggest a relationship between outcomes, policies, and success. If the outcomes of the ICT operations resulted into the satisfaction of all users or beneficiaries, then the policies which may have guided the designers and implementers of the ICT system contributed to or influenced the positive outcomes of the ICT operation. This observation implies that policies are built upon desired outcomes and desired outcomes are shaped and realized through policies. Thus, to increase the possibility of ICT success, designers and implementers should base their plans and guide their decisions on ICT policies which are grounded on “best practices”, because the latter is assumed to have also addressed beforehand the threats of failure as defined in the “design-reality gaps” model.

Adopting therefore as premise the above explanation, the analysis and findings on outcomes and policies underscoring “best practices” in Tables 1 and 2, respectively, a logical extraction of a set of success variables, which ICT experts alluded to as key management principles in e-Governance, follows. From among a possible set of “best practices” policies drawn qualitatively based on highest number of agency responses as reflected in Table 1, greatest degree of management attention as reflected in Table 2, and widest interaction between government, private sector, and the citizenry as parameter for e-Governance, the following success variables emerged:

**Leadership support.**

The greatest attention given by management and widest sector interaction were on support. As policymaking for ICT development becomes more democratic, support for the e-Governance initiative increases. World Bank ICT experts strongly view support as a critical success factor, emphasizing the importance of support from the leadership of government.

**Multi-stakeholder participation.**

The greatest number of agency responses and widest sector interaction were on participation. As suggested by World Bank ICT experts, a policy of strong multi-stakeholder participation (which includes the citizenry) is necessary to strengthen support. The multi-agency participation of public, privately- and/or publicly-owned business organizations, and international donor agencies through linkages and partnerships is often and widely reflected in all the ICT projects of the country cases.

**Agreement between organizational objectives, structure, competencies, and ICT design.**

The greatest attention given by management is on the ICT design focus. As an internal policy of flexibility, of strong central coordination and implementation, of common standards, and of strong linkage with sectoral and administrative reforms, are equally important management concerns. In particular, the setting up of the structure of the host organization according to World Bank ICT experts, and the closing of existing gaps between the design of the e-Governance system and the host organization, require cautious attention. An internal policy of continuous skills development and training for ICT operation was emphasized by the implementers of the country cases to strengthen the competencies of the host organization.

Close attention to software development and application to meet the design of the ICT system, as an integral part of the above-mentioned success factor, was emphasized in the case of the Philippines. An internal policy of rationalizing ICT objectives and values into the design of the ICT system is important to close existing gaps between the ICT design and the environment of the host organization.
Conclusion

The paper concludes that the emergent outcomes and policies, resulting from an analysis of the ICT “best practices” of the country cases, reflect the governance principles of participation, transparency, predictability, and accountability. Thus, an ICT system designed and managed within the purview of “best practices” leads to a successful e-Governance initiative.

The paper also concludes that the emergent outcomes and policies of the ICT systems of the cases reflect different approaches to addressing similarly implied or apparent ICT design-reality gaps. Thus, the seven dimensions of the Heeks model appear more as independent variables than overlapping variables.

Recommendation

Based on the conclusions of the paper, the following recommendations are suggested:
1. Include substantive information on the processes, technology, and other resources, if possible, in the writing of cases by World Bank representatives on ICT “best practices” to provide a more comprehensive basis for research purposes on e-Governance;
2. Conduct more researches using Heeks design-reality gaps model using would-be samples of cases as prescribed in recommendation 1 to test further the applicability of the model.

References


Judicious Method: A Paradigm Shift in Inventory Management Decision

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Abstract

In this paper, an inventory model with a time-varying demand also called as the Dynamic Economic Order Quantity Model was developed. The traditional or classical inventory model popularly known as the Economic Order Quantity model (EOQ) is used to manage production and inventory items based on the assumption that the demand for an item is constant in time. The EOQ model can help and guide managers in determining the optimum order quantity by minimizing the total cost of ordering and holding inventory items. An appropriate mathematical approach is developed where the model assumes that the time rate of change of inventory is proportional to the decrease in demand. The procedure of minimizing the total cost equation lead us to an equation for the order cycle time. The present scheme is applied to the calculation of total cost so that a judicious choice between treating the last two orders as integrated single order or two separate orders can be made. As an illustration of this scheme, several types of demand have been considered such as constant, linear, quadratic and exponential demands.

Keywords: Dynamic Economic Order Quantity Model, Judicious Treatment, cycle time, optimal order size, total cost, constant, linear, quadratic and exponential type of demand
Background

Inventory management is important and crucial as it requires a great deal of capital and the efficient delivery of goods to customers affects all business functions. In particular, Marketing, Operations and Finance. Thus, inventory control will be an important asset as well as an advantage to companies. Inventory models have been developed to guide and advise operations managers regarding the basic issues such as “How much to order” and “When to order” in such a way as to minimize total costs. The simplest model was developed by Ford Whitman Harris and is well-known as Economic Order Quantity model or simply the EOQ model. The model introduced the concept of holding cost and ordering cost in the total equation. By minimizing the total cost equation, one obtains the EOQ or the optimal order quantity. The model calculates the optimal order size and the order cycle time in case the demand is constant.

Operations managers are therefore faced with a great responsibility of organizing and interpreting inventory data and must judiciously choose an appropriate inventory model for guidance and recommendations in making inventory decisions. The theoretical basis of most inventory models is highly mathematical, complicated and difficult to apply; hence, many business managers may be indifferent or even less appreciative to available software technologies which are expensive.

Inventory models are developed to guide the planning and control for the replenishments of inventory items. Thus, the characteristics of the inventory system like demand and deterioration rate and associated costs such as holding, ordering and deterioration must be known. Several papers which deal with inventory management have considered various types of time varying demand trends such as constant (Shah & Jaiswal, 1977), linear (Chung & Ting, 1993; Ritchie, 1984; Donaldson, 1977), exponential (Juneau & Codics, 2001; Kishan & Mishra, 1995; Ghare & Schrader, 1963), and quadratic (Ghosh & Chaudhuri, 2006). These models may arise in practical applications. However, realistic models have been developed to account for deterioration, shortages, production etc., as reflected in some papers (Mishra & Shah, 2008; Manna & Chaudhuri, 2001; Wu, Lin, Tan & Lee, 2000; Covert & Philip, 1973).

Normal business conditions require a fix time horizon and an optimal replenishment policy schedule is determined to provide information on the number of orders as well as the number of items required per order.

Since business environments are highly dynamic where changes may occur rapidly either from declining market demand or accelerated growth, hence, an ordering schedule with unknown time horizon which gives unequal replenishment times may be practical and economically advantageous (Abdul, Murata & Oluleye, 2008). However, for cases where the total time horizon $H$ is fixed, workers in these areas consider the sum of the minimally computed total cost per order over the entire time horizon as the minimal total cost (Mishra & Shah, 2008; Abdul, Murata & Oluleye, 2008; Ghosh & Chaudhuri, 2006; Juneau & Codics, 2001; Manna & Chaudhuri, 2001; Wu, Lin, Tan & Lee, 2000; Kishan & Mishra, 1995; Chung & Ting, 1993; Ritchie, 1984; Donaldson, 1977; Shah & Jaiswal, 1977; Covert & Philip, 1973; Ghare & Schrader, 1963); however, the current researchers find that their treatments may not lead to the optimal total cost.

The purpose of this paper is to develop an inventory model that is simple in approach. The model assumes a total cost equation that includes the holding cost and ordering cost terms. By minimizing the total cost equation, a simple integral expression with scaling term is developed.

A judicious method of optimization is also introduced, where the decision of taking the last two orders as a single order or taking them separately has been considered so that the optimal total cost is obtained. We realized that judicious treatment should always be applied whenever there are at least two orders and this should be done for all types of demand with or without deterioration. For simplicity of presentation, we assume that inventory item does not deteriorate. Generalization of the case with deterioration can be done in a straightforward manner.
Research Problem

The purpose of this paper is to develop an inventory model for different types of demand trends which are time-dependent. That includes a judicious method of optimization, where the decision of taking the last two orders as a single order or treating them as a separate order to obtain the optimal total cost is fulfilled or delivered.

If the traditional EOQ model appears inappropriate for inventory management needs, what formalisms can be developed to derive the Dynamic Economic Order Quantity (DEOQ) model based on time-varying demand? The following questions will be used as a guide to develop the DEOQ model:

1. An inventory model to determine the optimal order size and cycle time that is based on time-varying (known as Dynamic Economic Order Quantity Model) should be developed. What analytical approach can be used to calculate the DEOQ when the demand follows a linear trend?
2. What analytical approach can be used to calculate DEOQ when the demand follows an exponential trend?
3. Numerical examples can be used to assess the DEOQ model. What are the differences between values obtained using DEOQ with that of the classical EOQ in terms of optimal order size and cycle time?
4. What analytical approach can be used to calculate the total cost judiciously for all cases of demand?
5. What prescriptions and predictions can this new model suggest in terms of inventory management decisions?

Theoretical Framework

The central objective of this paper is to develop a new scientific and practical approach for inventory management control. To guide management decisions using a simple analytic approach to compute for the inventory parameters like optimal order size, cycle times, total cost using judicious treatment and assess the model through numerical examples. There are six steps used in developing the new DEOQ formalism:

1. The formalism developed by Ford Whitman Harris in 1915 is used to derive the EOQ model on the basis of using a constant demand. The parameters $C_h$ for holding cost and $C_o$ for ordering cost are introduced and its use is explained.
2. The mathematical steps to the solution of the time-dependent inventory equation is derived and introduced the important quantities like the inventory level $I(t)$, optimal order quantity $Q_o$, cycle time $T$, average inventory $Q$ and total cost equation per order $T_c$.
3. The minimization process for the average annual total cost, $T_{CA}$ is carried out to obtain equations for the order cycle time $T$ for the different demand trends.
4. Use real business data to apply the numerical procedure developed and compute for the parameters $Q_o$ and $T_c$ for various periods $T$ for each type of demand.
5. Introduce the concept of judicious optimization and apply the method to compute for the minimized total cost.
6. To assess the main gain of the optimization process in terms of minimized total costs and higher economic profit.
Methodology

The model assumes that the time-rate of change of inventory is proportional to the decrease in demand, that is,

$$\frac{dl}{dt} = -D(t)$$

From this, the average quantity in the inventory is calculated as a function of time and is used in the total cost equation. Minimization of the total cost equation has led to the order cycle time and to the economic order quantity. The formalisms used to derive these are as follow:

- Inventory Level:
  $$I(T) - I(t) = -\int_t^T D(s) ds$$

- Optimal Order Size:
  $$Q_o = I(T_0) = \int_{T_0}^T D(s) ds$$

- Average Inventory:
  $$Q = \int_{T_0}^T \int_t^T D(s) ds dt$$

- Total Cost Equation:
  $$T_c = C_h Q + C_o$$

- Optimization Equation:
  $$\frac{\partial(TC)}{\partial t} = 0$$

Results and Discussion

The results of the above formalism for different types of demands are summarized in Tables 1 and 2.

Table 1
Summary of results for Constant and Linear Demands

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Constant</th>
<th>Linear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form of Demand</td>
<td>$D(t) = a_o$</td>
<td>$D(t) = a_o + a_1 t$</td>
</tr>
<tr>
<td>Optimal Order Size, $Q_o$</td>
<td>$Q_o = a_o T$</td>
<td>$Q_o = a_o T + \frac{1}{2} a_1 T^2$</td>
</tr>
<tr>
<td>Cycle Time, $T$</td>
<td>$C_h \left(\frac{1}{2} a_o T^2\right)$</td>
<td>$C_h \left(\frac{1}{2} a_o T^2 + \frac{2}{3} a_1 T^3\right)$</td>
</tr>
<tr>
<td>Total Cost per Cycle, $T_c$</td>
<td>$T_c = C_h \left(\frac{1}{2} a_o T^2\right) + C_o$</td>
<td>$T_c = C_h \left(\frac{1}{2} a_o T^2 + \frac{1}{3} a_1 T^3\right) + C_o$</td>
</tr>
</tbody>
</table>
Table 2
Summary of results for Quadratic and Exponential Demands

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Quadratic</th>
<th>Exponential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form of Demand</td>
<td>(D(t) = a_0 + a_1 t + a_2 t^2)</td>
<td>(D(t) = a_0 e^{at} )</td>
</tr>
<tr>
<td>Optimal Order Size, (Q_o)</td>
<td>(Q_o = a_0 T + \frac{1}{2} a_1 T^2 + \frac{1}{2} a_2 T^3)</td>
<td>(Q_o = \frac{a_0}{a}(e^{at} - 1))</td>
</tr>
<tr>
<td>Cycle Time, (T)</td>
<td>(C_o = C_h \left( \frac{1}{2} a_0 T^2 + \frac{2}{3} a_1 T^3 \right.)</td>
<td>(C_o = C_h a_0 a^{-2} [(aT)^2 e^{at} - (aT)e^{at} )</td>
</tr>
<tr>
<td></td>
<td>(\left. + \frac{3}{4} a_2 T^4 \right))</td>
<td>(+ e^{at} - 1]</td>
</tr>
<tr>
<td>Total Cost per Cycle, (T_c)</td>
<td>(T_c = C_h \left( \frac{1}{2} a_0 T^2 + \frac{1}{3} a_1 T^3 \right.)</td>
<td>(T_c = C_h a_0 a^{-2} (aT)^2 e^{at} )</td>
</tr>
<tr>
<td></td>
<td>(\left. + \frac{1}{4} a_2 T^4 \right) + C_o)</td>
<td></td>
</tr>
</tbody>
</table>

Numerical application of these results is applied to a certain fruit product, with annual inventory data given in Table 3 (Concepcion, Garrido & Pastrana, 2009).

Table 3
Fruit Product Demand for the last six years

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Demand (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>16586</td>
</tr>
<tr>
<td>2005</td>
<td>23718</td>
</tr>
<tr>
<td>2006</td>
<td>33916</td>
</tr>
<tr>
<td>2007</td>
<td>48501</td>
</tr>
<tr>
<td>2008</td>
<td>69356</td>
</tr>
<tr>
<td>2009</td>
<td>99178</td>
</tr>
</tbody>
</table>

With this trend of demands, an empirical approach is applied to identify the demand parameters for different types of demands such as constant, linear, quadratic and exponential. Results are given in Table 4 (Constant demand), Table 5 (Linear Demand), Table 6 (Quadratic demand) and Table 7 (Exponential Demand). For each table, the cycle time (\(T\)), optimal order size (\(Q_o\)) and the total cost per cycle (\(T_c\)) are tabulated. The 4th and 5th columns are the values of the total cost per cycle, granting all orders are taken independently and the last two orders are taken as a single order, respectively. The
annual total cost ($T_{CA}$) for these two cases are depicted in Figures 1, 3, 5 and 7. Similarly, the order size scheme for different types of demand are given in Figures 2, 4, 6 and 8.

Table 4

<table>
<thead>
<tr>
<th>Order Number</th>
<th>$T$</th>
<th>$Q_o$</th>
<th>$T_c$</th>
<th>$T_c$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>16,000.00</td>
</tr>
<tr>
<td>2</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>16,000.00</td>
</tr>
<tr>
<td>3</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>16,000.00</td>
</tr>
<tr>
<td>4</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>16,000.00</td>
</tr>
<tr>
<td>5</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>16,000.00</td>
</tr>
<tr>
<td>6</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>16,000.00</td>
</tr>
<tr>
<td>7</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>16,000.00</td>
</tr>
<tr>
<td>8</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>16,000.00</td>
</tr>
<tr>
<td>9</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>16,000.00</td>
</tr>
<tr>
<td>10</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>16,000.00</td>
</tr>
<tr>
<td>11</td>
<td>0.087648</td>
<td>8692.80</td>
<td>16000</td>
<td>23,888.93</td>
</tr>
<tr>
<td>12</td>
<td>0.035874</td>
<td>3557.93</td>
<td>9340.2</td>
<td></td>
</tr>
</tbody>
</table>

$T_{CA}$ – annual total cost, taken the last two as separate orders

$T_{CA}^*$ – annual total cost, taken the last two orders as a single order

Figure 1. Annual Total Cost (Constant Demand Case)
Based on Table 4, it is judiciously advantageous to integrate the 11th and 12th orders into a single order. As a result, an overall total cost of PhP183,888.9 is achieved as compared to an overall total cost of PhP185,340.2. This makes the former result cheaper by PhP1,451.3.

Table 5
Linear Demand Case

<table>
<thead>
<tr>
<th>Order Number</th>
<th>T</th>
<th>Qo</th>
<th>Tc</th>
<th>Tc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.080595</td>
<td>9292.01</td>
<td>15890.71</td>
<td>15890.71</td>
</tr>
<tr>
<td>2</td>
<td>0.079793</td>
<td>9390.31</td>
<td>15893.94</td>
<td>15893.94</td>
</tr>
<tr>
<td>3</td>
<td>0.079021</td>
<td>9486.61</td>
<td>15896.99</td>
<td>15896.99</td>
</tr>
<tr>
<td>4</td>
<td>0.078278</td>
<td>9581.03</td>
<td>15899.87</td>
<td>15899.87</td>
</tr>
<tr>
<td>5</td>
<td>0.077562</td>
<td>9673.64</td>
<td>15902.59</td>
<td>15902.59</td>
</tr>
<tr>
<td>6</td>
<td>0.076872</td>
<td>9764.54</td>
<td>15905.17</td>
<td>15905.17</td>
</tr>
<tr>
<td>7</td>
<td>0.076205</td>
<td>9853.79</td>
<td>15907.62</td>
<td>15907.62</td>
</tr>
<tr>
<td>8</td>
<td>0.075561</td>
<td>9941.47</td>
<td>15909.94</td>
<td>15909.94</td>
</tr>
<tr>
<td>9</td>
<td>0.074937</td>
<td>10027.65</td>
<td>15912.15</td>
<td>15912.15</td>
</tr>
<tr>
<td>10</td>
<td>0.074334</td>
<td>10112.40</td>
<td>15914.25</td>
<td>15914.25</td>
</tr>
<tr>
<td>11</td>
<td>0.07375</td>
<td>10195.76</td>
<td>15916.26</td>
<td>15916.26</td>
</tr>
<tr>
<td>12</td>
<td>0.073183</td>
<td>10277.79</td>
<td>15918.17</td>
<td>15918.17</td>
</tr>
<tr>
<td>13</td>
<td>0.072634</td>
<td>10358.55</td>
<td>15920.00</td>
<td>17595.61</td>
</tr>
<tr>
<td>14</td>
<td>0.007275</td>
<td>1046.13</td>
<td>8079.93</td>
<td></td>
</tr>
</tbody>
</table>

\[ T_{CA} \]

214867.60

\[ T_{CA}^{*} \]

208463.27
Based on Table 5, it is judiciously advantageous to integrate the 13th and 14th orders into a single order. An over-all total cost of PhP214,867.6 is achieved, as compared to an over-all total cost of PhP208,463.27. This makes the former result cheaper by PhP6,404.33.
Table 6  
**Quadratic Demand Case**

<table>
<thead>
<tr>
<th>Order Number</th>
<th>T</th>
<th>Q₀</th>
<th>Tₐ₀</th>
<th>Tₐ₀⁺</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0792792</td>
<td>9404.616</td>
<td>15862.838</td>
<td>15862.83818</td>
</tr>
<tr>
<td>2</td>
<td>0.0782768</td>
<td>9529.266</td>
<td>15865.611</td>
<td>15865.61147</td>
</tr>
<tr>
<td>3</td>
<td>0.0773068</td>
<td>9652.95</td>
<td>15868.296</td>
<td>15868.29632</td>
</tr>
<tr>
<td>4</td>
<td>0.0763679</td>
<td>9775.673</td>
<td>15870.895</td>
<td>15870.89536</td>
</tr>
<tr>
<td>5</td>
<td>0.0754586</td>
<td>9897.444</td>
<td>15873.411</td>
<td>15873.41134</td>
</tr>
<tr>
<td>6</td>
<td>0.0745774</td>
<td>10018.27</td>
<td>15875.847</td>
<td>15875.84701</td>
</tr>
<tr>
<td>7</td>
<td>0.0737231</td>
<td>10138.16</td>
<td>15878.205</td>
<td>15878.20514</td>
</tr>
<tr>
<td>8</td>
<td>0.0728945</td>
<td>10257.13</td>
<td>15880.488</td>
<td>15880.48848</td>
</tr>
<tr>
<td>9</td>
<td>0.0720904</td>
<td>10375.18</td>
<td>15882.7</td>
<td>15882.69976</td>
</tr>
<tr>
<td>10</td>
<td>0.0713097</td>
<td>10492.33</td>
<td>15884.842</td>
<td>15884.84161</td>
</tr>
<tr>
<td>11</td>
<td>0.0705515</td>
<td>10608.59</td>
<td>15886.917</td>
<td>15886.91665</td>
</tr>
<tr>
<td>12</td>
<td>0.0698147</td>
<td>10723.97</td>
<td>15888.927</td>
<td>15888.9274</td>
</tr>
<tr>
<td>13</td>
<td>0.0690985</td>
<td>10838.48</td>
<td>15890.876</td>
<td>27554.64168</td>
</tr>
<tr>
<td>14</td>
<td>0.039251</td>
<td>6257.358</td>
<td>10583.916</td>
<td>10583.916</td>
</tr>
</tbody>
</table>

![Figure 5. Annual Total Cost (Quadratic Demand Case)](image_url)
Based on Table 6, it is judiciously advantageous to take the 13\textsuperscript{th} and 14\textsuperscript{th} orders into separate orders. As when combined, this will give an over-all total cost of PhP218,073.6204, whereas when taken into separate orders, the over-all total cost would only be PhP216,993.77, showing a difference of PhP1,079.85.

Table 7

<table>
<thead>
<tr>
<th>Order Number</th>
<th>T</th>
<th>Qo</th>
<th>Tc</th>
<th>Tc</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.079900</td>
<td>9561.83</td>
<td>16060.11</td>
<td>16,060.11</td>
</tr>
<tr>
<td>2</td>
<td>0.078800</td>
<td>9701.66</td>
<td>16064.86</td>
<td>16,064.86</td>
</tr>
<tr>
<td>3</td>
<td>0.077700</td>
<td>9837.74</td>
<td>16063.30</td>
<td>16,063.30</td>
</tr>
<tr>
<td>4</td>
<td>0.076600</td>
<td>9969.81</td>
<td>16055.34</td>
<td>16,055.34</td>
</tr>
<tr>
<td>5</td>
<td>0.075600</td>
<td>10111.16</td>
<td>16062.41</td>
<td>16,062.41</td>
</tr>
<tr>
<td>6</td>
<td>0.074600</td>
<td>10249.04</td>
<td>16063.77</td>
<td>16,063.77</td>
</tr>
<tr>
<td>7</td>
<td>0.073600</td>
<td>10383.23</td>
<td>16059.36</td>
<td>16,059.36</td>
</tr>
<tr>
<td>8</td>
<td>0.072600</td>
<td>10513.46</td>
<td>16049.10</td>
<td>16,049.10</td>
</tr>
<tr>
<td>9</td>
<td>0.071700</td>
<td>10654.56</td>
<td>16055.57</td>
<td>16,055.57</td>
</tr>
<tr>
<td>10</td>
<td>0.070800</td>
<td>10792.38</td>
<td>16056.91</td>
<td>16,056.91</td>
</tr>
<tr>
<td>11</td>
<td>0.069900</td>
<td>10926.69</td>
<td>16053.06</td>
<td>16,053.06</td>
</tr>
<tr>
<td>12</td>
<td>0.069000</td>
<td>11057.28</td>
<td>16043.95</td>
<td>16,043.95</td>
</tr>
<tr>
<td>13</td>
<td>0.068200</td>
<td>11200.55</td>
<td>16053.32</td>
<td>28,850.12</td>
</tr>
<tr>
<td>14</td>
<td>0.041000</td>
<td>6866.15</td>
<td>10963.1</td>
<td></td>
</tr>
</tbody>
</table>

\[ T_{CA} \] \quad 219704.2

\[ T_{CA} \] \quad 221,537.86
Based on Table 7, it is judiciously advantageous to take the 13th and 14th orders into separate orders. In doing so, this will gave an over-all total cost of PhP219,704.20 as compared to an over-all total cost of PhP221,537.20 if the 13th and 14th orders are taken as a single order, showing a difference of PhP1,833.66.
In this paper, for constant and linear demands, it is advantageous to treat the last two orders as a single order. While for quadratic and exponential, it is financially beneficial to treat the last two orders independently. Note that the results are based on the inventory data used as shown on Table 3.

Conclusion

An alternative formalism is developed to derive the classical economic order quantity model with constant demand. The same formalism is used for DEOQ model of time varying demand. It is used to calculate the optimal order size and cycle time for linear; quadratic and exponential types of demand. It was found out that if the demand trend is increasing with time, DEOQ model is more suitable to use than the classical EOQ. Moreover, a suitable inventory system (that optimizes inventory management cost and maintains a balance between inventory investment and customer service) necessary to maximize profit and avoid inventory losses is developed. The MS EXCEL program is essential for the easy management of data and graphs presentation.

Also, the work describes the use of the judicious method in obtaining an optimized over-all total inventory cost of the dynamical inventory problem for entire fixed planning horizon \( H \). The method is applied to different inventory models. The treatment of the system without deterioration should not be considered as a limitation of the method, rather this is done for simplicity of discussion. It should be noted that the method is generally applicable for systems with deterioration, backlog and other systems that have a planning time horizon that is greater than the first ordering period \( T_1 \). Examples are shown on how the judicious method should be applied for the last two orders for different cases of demand trends such as constant, linear, quadratic and exponential. It is shown that for particular choices of parameters with time horizon of one year, the scheme of integrating the two orders into a single order is economically beneficial. This shows that the conventional wisdom of summing the minimized average total inventory cost, treating each order separately for the entire time horizon, does not necessarily produce an optimal over-all total inventory cost.

So far, we have demonstrated here a judicious method of optimizing the over-all total cost for the case of no deterioration and for unequal replenishment. Thus, the future direction of this work is the treatment of systems with deterioration for unequal replenishment (Basco & Garrido, n.d.) and the extension of this method for equal replenishment is also underway (Basco, n.d.). A scientific approach in forecasting inventory parameters starting from raw data is also an understudy (Basco, Garrido & Concepcion, n.d.).

Recommendation

This research can be used easily by entrepreneurs and operations managers of small to large scale industries in dealing with inventories and demand forecasting through proper dissemination such as echo seminars and trainings with workshops. Sophisticated software is not necessary because a simple MS Excel program can be used for calculations. Since this program is accessible and affordable to small-medium sized enterprises, the DEOQ Model can easily be applied, combined with proper training to middle-management and staff positions. It can easily be applied in inventory management decisions and related applications e.g forecasting. Furthermore, Inventory modelers can use the same formalism used in this research to develop alternative approach such as cubic time-dependence or polynomial time – dependence demand.

In the academe, through proper information dissemination, the new concept can easily be understood by both academicians and students in their inventory management modeling (Quantitative Techniques) and operations strategy formulation and decision making (Production and Operations Management) and also for firms adopting contemporary management philosophies such as continuous
improvement, six sigma, lean manufacturing and Just in Time (JIT), all aiming at reducing cost (primarily inventory), and effectiveness and efficiency in operation.

For software developers, this model can easily be integrated as a software module to the existing software/interface used for Enterprise Resource Planning (ERP) dominated by SAP R/3, Oracle, PeopleSoft, Baan, JD Edwards and Mfg Pro. The integrated system feature of ERP heavily relies on the accuracy of forecasts, primarily inventory and sales. With the introduction of affordable ERP systems such as SAP Business One System, small-medium sized enterprises can easily afford the System and the integration of DEOQ in both forecasting and purchasing modules.

References


Evaluating Entrepreneurship Training Programmes
Intercultural Concepts and Practical Experiences in Developing Countries

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Abstract

Although a great deal of time, resources and effort goes into the education of – potential or existing – entrepreneurs, our knowledge about the effects of this education is still rather limited. There is a structural imbalance between the substantial amount of finance and manpower invested in entrepreneurship programmes – at various levels, for different target groups and competing learning approaches – and the very limited amount invested in the evaluation of these programmes. The contribution develops a comprehensive concept for evaluating entrepreneurship education programmes, discusses some methodological and political problems, and draws some general conclusions for future research and practice. Based on intercultural research and personal experiences of the author with the evaluation of International Entrepreneurship Education Program (IEEPs) in African, Asian, and Latin American countries, different conceptual frameworks and tools of entrepreneurship education evaluations are being presented. The impact of competing IEEPs on different levels are being analysed, lessons learned from these experiences are being discussed with respect to theoretical and methodological foundations of evaluations and practical problems of implementation, as well as some recommendations for research are being developed. The contribution is based on a “most different system” approach, applying a mix of quantitative and qualitative instruments of social research.

Keywords: Entrepreneurship education, entrepreneurship education program evaluation, entrepreneurship training program
Background

The Limits of Our Knowledge

When people start a business, extends a business or take over a business— they do learn, with, and without training. And although a great deal of time, resources and effort has gone into the education of entrepreneurs, our knowledge about the effects of this education is still rather limited (Kirby, 2007, p. 21). Without exaggeration one can argue that there is a discrepancy between the substantial amount of resources invested in entrepreneurship education programmes—at various levels, for different target groups and with competing learning approaches—and the very limited amount invested in the evaluation of these programmes, i.e. in the analyses of their impact. Therefore the question still is: “With all this activity, there is still the nagging question: are we doing anyone any good?” (Robinson & Sexton, 1985, p. 143).

Theoretical Framework

Evaluation Approaches and Criteria

To evaluate something originally comes from the Latin word 'evaluare', which means to 'value', 'judge', 'assess'. “Evaluation refers to the process of worth or significance of an activity, policy or program. It is as systematic and objective as possible of a planned, ongoing, or completed intervention” (Organisation for Economic Co-operation and Development [OECD], 2000, p. 21). The term ‘valuing’ is used to differentiate evaluation from research and monitoring activities.

Three different “conceptual frameworks” of evaluations do exist (Chelimsky, 1996, p. 113):

1. Evaluations with a research orientation / interest;
2. Evaluations with a control interest; and
3. Evaluations with a learning and development interest.

Within all three conceptual frameworks, two different approaches—a traditional and a participatory approach—can be applied.

Traditional evaluation has developed guidelines for specific techniques in an attempt to increase the reliability and validity of their findings when applying a predetermined design the focus is on accountability and formal evaluation methods. And ‘outside’ experts (not being involved in the implementation of the programme) are evaluating in the interest of donors and funding agencies.

The participatory approach identifies and involves people, agencies, and organizations with a stake in the programme. People may include jobless youth, single women and families in marginalized communities. They also include programme staff, agency management—and all those stakeholders affected by the decisions made through the participatory research process (Narayan, 1966, as cited in Narra Imas and Rist, 2009, p. 194).

Table 1
Features of Traditional and Participatory Evaluation Approaches

<table>
<thead>
<tr>
<th>Traditional</th>
<th>Participatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donor focus and ownership</td>
<td>Participant focus and ownership</td>
</tr>
<tr>
<td>Focus on accountability and judgment</td>
<td>Focus on learning</td>
</tr>
<tr>
<td>Predetermined design</td>
<td>Flexible design</td>
</tr>
<tr>
<td>Formal methods and techniques</td>
<td>More informal methods and techniques</td>
</tr>
<tr>
<td>Outsiders as evaluators</td>
<td>Outsiders as facilitators</td>
</tr>
</tbody>
</table>

Source: Morra Imas and Rist (2009, p. 194)

The participatory approach identifies and involves people, agencies, and organizations with a stake in the programme. People may include jobless youth, single women and families in marginalized communities. They also include programme staff, agency management—and all those stakeholders affected by the decisions made through the participatory research process (Narayan, 1966, as cited in Narra Imas and Rist, 2009, p. 194).
Morra Imas & Rist, 2009, p. 194). The focus is on learning, using a flexible design and applying more informal evaluation methods. As planning decisions, identifying the questions, evaluation techniques are made together with the participants ‘outsiders’ are only needed as facilitators. In short: it is a joint bottom-up process rather than the traditional top-down process. “The participatory evaluation approach is receiving increased attention in the development context” (Morra Imas & Rist, 2009, p. 194). Although participatory evaluation poses considerable challenges (higher transaction costs/time-consuming/group dynamic processes/conflicts/danger of not being objective) it has two inestimable advantages: it increases the credibility of the evaluation results in the eyes of the involved stakeholders, as well as the likelihood that the results will be used and implemented. In addition, advocates of participatory evaluation see it as a tool for empowering participants and increasing local human resource capacity for engaging in the development process.

A growing, broadly motivated interest in the – if possible – objective, inter-subjective comparable evaluation of training programmes and their application drives the development of systematic evaluation. Some experts trace the emergence of modern evaluation methods to the advent of the natural sciences and the emphasis on observed phenomena (the empirical method) in the late 17th century (f. e. in Sweden and in several Anglo-Saxon countries). In the United States, pioneering efforts were made during the 1800’s to examine the quality of the school system using achievement tests. These efforts continued to the present day, when student achievement scores remain a key measure for determining the quality of education in schools. “The beginnings of accreditation for secondary schools and universities in the United States also began during this period” (Morra Imas & Rist, 2009, p. 20).

The impossibility of an overall valid definition of evaluation has made standards, criteria and indicators as the more important, in particular as these have recently increased with the establishment of scientific evaluation research in pedagogy (see Figure 1).

**Figure 1. Selected Evaluation Criteria**

| Relevance | Relevance refers to the appropriateness of the explicit objectives of the programme in relation to the socio-economic problems and needs it is supposed to address. f. e.: *Is the programme justified with regard to the needs or problems of (potential) entrepreneurs?* |
| Effectiveness | Effectiveness refers to the degree to which objectives are achieved and to which the problems targeted at by the programme have been resolved. (“*Did we do the right things?*”). |
| Efficiency | Efficiency refers to the degree to which economy is achieved while maintaining effectiveness. Efficiency is assessed by comparing the results obtained (preferably impacts produced) and the resources mobilised by a programme. (“*Did we do the things rightly?*”). |
| Sustainability | Sustainability is concerned with what happens after a programme has been completed. A typical evaluation question that is related to the sustainability of a programme promoting entrepreneurship is: “*Can output and impact obtained be expected to last after the programme has been completed?*” |

Source: Sheik and Steiber (2002, p.10)
Governments and programme managers have long engaged in evaluation – tracking their expenditures, resources, staffing levels, programme activities, numbers of training participants and services produced, for example. However an important distinction needs to be drawn between conventional and result-based evaluations. Conventional evaluation focuses on the evaluation of – financial and manpower – inputs and activities. Result based evaluation combines the traditional approach with the assessment of outputs and impact or, more generally, of results of the programme.

It is this linking of implementation process with progress in achieving the desired objectives of training programmes as well as projects that make result-based evaluations useful as a management tool. According to Morra Imas & Rist (2009, p. 20) result- or impact evaluations allow the organization to modify and make adjustments to the implementation process in order to intervene and support the achievement of desired objectives and outputs. In contrast to the conventional evaluation approach impact evaluations are based on a kind of theory of change which tries to explain the relations between causes and consequences. The theory of change typically has five main components, sometimes target groups, and internal and external factors being included in it (Figure 2).

Four findings are in our context of special importance:

1. A general valid definition of evaluation does not exist. "To say that there are as many definitions as there are evaluators is not so far from accurate" (Franklin & Trasher, 1976, p.10).
2. Men do evaluate, not machines. To evaluate means to give - more or less - subjective value judgements. "Subjective value judgements are inherent in evaluation and the question that a useful theory of effectiveness must address is and result-oriented whose values should count for how much" (Keely, 1988, p.189).
3. Evaluations are goal- and result-oriented. Their objectives are to judge / assess practical measures / projects / programmes and to contribute to their improvement (Morra Imas & Rist, 2009).
4. Evaluations should be based on a theory of change, moving from inputs to results (see Figure 2).

Figure 2. Main Components of a Theory of Change

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>Resources that go into a project / program / policy (funding / staffing/equipment / teaching aides)</td>
</tr>
<tr>
<td>Activities</td>
<td>What we do – stated with a verb (“provide” / “facilitate”/”deliver”/ ”train” / “educate” / “market”)</td>
</tr>
<tr>
<td>Outputs</td>
<td>What we produce = tangible products or services produced as result of the activities; can be counted</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Why we do it = behavioural changes that result from the project output; can be increased / decreased / enhanced / maintained / improved</td>
</tr>
<tr>
<td>Impacts</td>
<td>Long-term changes that result from an accumulation of outcomes.</td>
</tr>
</tbody>
</table>

Source: Kusek & Rist (2004, p. 52)
Objectives and Methodology of the Entrepreneurship Education Evaluation Study

With respect to entrepreneurship education, normally programmes do have three different aims, depending on the needs of the target groups and resources available: (1) learning about entrepreneurship; (2) learning entrepreneurial skills; and (3) learning to become a start-up entrepreneur (see Figure 3).

To reduce complexity, our evaluations were interested as aims of the evaluation (WHY? in Figure 3) in impact analysis (although the results of the impact analysis can be used in a feed-back process for programme planning and monitoring).

One aim of the programmes (WHAT? in Figure 3) in ‘learning to become an entrepreneur’, i.e. business start-up programmes. As Finnish researchers found out, these aims were dominated by European entrepreneurship education programmes with 84 percent of all programmes (Hytti & Kuopusjärvi, 2004, p. 25).

Our interest was neither research nor control - but interactive learning, i.e. the change of attitudes both of the evaluated and the evaluators, dependent on subjective value judgements and the interest of our clients (for details see Braun, 2008, p. 92). These clients were the German Agency for Technical Cooperation (GTZ), Eschborn and the Austrian Development Agency, Vienna.

Figure 3. Aims and Contents of Entrepreneurship Education Evaluations

Source: Hytti and Kuopusjärvi (2004, p. 34)
Applying a ‘most-different-tools’-approach (HOW? In Figure 3) we developed a methodological mix consisting of:

- a questionnaire with 67 closed/open questions for altogether 320 participants of entrepreneurship education programmes,
- a questionnaire with 58 closed/open questions for 65 participants of training of trainer courses (TOT),
- a questionnaire with 47 closed/open questions for 53 participants of so-called appreciation workshops with project managers/Civil Servants,
- a structured in-depth-guide for 119 trainers + programme managers,
- open discussions in so-called regional workshops, altogether 14 workshops with 185 participants of entrepreneurship trainings,
- participation in 12 entrepreneurship training programmes,
- 27 on-site-visits of start-up firms.

The entrepreneurship education programmes were conducted in five developing countries in Latin America (Brazil & Chile), Africa (Kenya), and Asia (Philippines & Vietnam) between 1995 and 2006.

The participants of the business start-up training were a very heterogeneous group (university graduates, vocational training leavers, school drop-outs, illiterates, refugees, ex-combatants, jobless youths, released Civil Servants, single women, vulnerable groups of the informal sector).

<table>
<thead>
<tr>
<th>Country</th>
<th>Entrepreneurship Education Programme</th>
<th>Training of Trainers (TOT)</th>
<th>Stakeholders Project Managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>N=52</td>
<td>N=27</td>
<td>N=8</td>
</tr>
<tr>
<td>Chile</td>
<td>N=53</td>
<td>N=14</td>
<td>N=6</td>
</tr>
<tr>
<td>Kenya</td>
<td>N=88</td>
<td>N=12</td>
<td>N=30</td>
</tr>
<tr>
<td>Philippines</td>
<td>N=80</td>
<td>N=12</td>
<td>N=6</td>
</tr>
<tr>
<td>Vietnam</td>
<td>N=47</td>
<td>____</td>
<td>N=3</td>
</tr>
<tr>
<td>Total</td>
<td>N=320</td>
<td>N=65</td>
<td>N=53</td>
</tr>
</tbody>
</table>

The evaluation team consisted – depending on the local situation – of mixed teams, normally 3 international experts as ‘outsiders’ – and 2 –3 local trainer / programme manager as ‘insiders’ (BY WHOM? in Figure 3). The evaluation tools / indicators and criteria applied were relying on existing formal methods and the evaluations were commissioned by international donor agencies – there was a strong ‘traditional’ component in the applied approach. But by creating mixed evaluation teams of in– and outsiders, and conducting more informal workshops, focus-group discussions, combined with on-site-visits introduced a component participatory.
Figure 4. Participants of Entrepreneurship Education Programmes by Country and Formal Education (percentage)

![Bar chart showing participants of entrepreneurship education programs by country and formal education (percentage).]

<table>
<thead>
<tr>
<th>Percentage of Sample</th>
<th>Males</th>
<th>Females</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>3</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>48</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>Services</td>
<td>19</td>
<td>73</td>
<td>27</td>
</tr>
<tr>
<td>Trade</td>
<td>14</td>
<td>39</td>
<td>61</td>
</tr>
<tr>
<td>Mixed*</td>
<td>16</td>
<td>48</td>
<td>52</td>
</tr>
</tbody>
</table>
Container Knowledge versus Entrepreneurship Competence Education

With a radical reduction of complexity we can ideally distinguish between two competing approaches of entrepreneurial training programmes, we identified and evaluated during the evaluation study:

(1) The conventional knowledge; and (2) entrepreneurial competence learning approach.

They differ fundamentally in their goals, methods, learning arrangements and – last, but not least – impact on the entrepreneurship promotion (for details see Table 4).

The training programmes lasted 12 weeks on average, were standardized – and implemented mainly by local NGOs, training institutes, consultant firms or International Development Agencies (CIDA, Oxfam, SIDA, US/Aid, GTZ). All trainers were predominantly national or international university graduates with BA or MA certificate or a PhD degree.

Table 4  
Container Knowledge versus Entrepreneurial Competence Education

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Container Knowledge</th>
<th>Entrepreneurial Competences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SUPPLY Oriented</td>
<td>DEMAND Oriented</td>
</tr>
<tr>
<td>1. Approach</td>
<td>Content Driven</td>
<td>Process Driven</td>
</tr>
<tr>
<td>2. Focus</td>
<td>Teacher-led</td>
<td>Student-centred</td>
</tr>
<tr>
<td>3. Emphasis</td>
<td>Knowing that</td>
<td>Knowing how</td>
</tr>
<tr>
<td>4. Role of teacher</td>
<td>Expert</td>
<td>Facilitator/Fellow learner</td>
</tr>
<tr>
<td>5. Student’s Activity</td>
<td>Working alone</td>
<td>Working in small groups</td>
</tr>
<tr>
<td>6. Student’s role</td>
<td>Passive/Receptive</td>
<td>Active/Generative</td>
</tr>
<tr>
<td>7. Student’s Expectation</td>
<td>Dependence</td>
<td>Independence</td>
</tr>
<tr>
<td>8. Student’s discretion</td>
<td>Limited</td>
<td>Wide</td>
</tr>
<tr>
<td>9. Ethos</td>
<td>Competitive</td>
<td>Collaborative</td>
</tr>
<tr>
<td>10. Lessons</td>
<td>Programmed</td>
<td>Flexible, opportunist</td>
</tr>
<tr>
<td>11. Topic</td>
<td>Imposed</td>
<td>Negotiated</td>
</tr>
<tr>
<td>12. Mistakes</td>
<td>Not to be made</td>
<td>Are to be learned from</td>
</tr>
<tr>
<td>13. Assessment</td>
<td>Exams/tests</td>
<td>Profiles, results</td>
</tr>
<tr>
<td>14. View of the world</td>
<td>Right-wrong</td>
<td>Uncertainty, shades</td>
</tr>
<tr>
<td>15. Determined by</td>
<td>Exam boards</td>
<td>Local needs</td>
</tr>
<tr>
<td>16. Staffed by</td>
<td>Subject experts</td>
<td>Cross Curriculum team</td>
</tr>
<tr>
<td>17. Aim</td>
<td>Theory into practice</td>
<td>Practice into theory</td>
</tr>
</tbody>
</table>


The conventional container approach is based on an input-output-learning paradigm. Learning is interpreted as the systematic and evolutionary elimination of not-knowing, i.e. it is based on input logics. "If we fill up the participants with more resources (knowledge, management skills, finance) the output (start-ups, entrepreneurship) will increase" (Röpke, 2002, p. 276). Consequently, the learner is 'filled-up' with supply-oriented basic knowledge in law, business administration, finance, marketing etc. by 'all-knowing' superior instructors, trainers or professors. The predominant teaching method is knowledge
teaching ex cathedra (front-desk-teaching). The participants are blocked in a passive-receptive role of consumers.

On the contrary to container learning the entrepreneurial competence approach is demand- or needs-oriented. It is based on a constructivist learning paradigm, and aims at activating entrepreneurial motivation – and only to a lesser extent at acquiring knowledge. The strengthening of entrepreneurial competences “is considered as a crucial input which enhances confidence, positive-thinking and self-awareness” (Hartig, 1992, p.1). The centrepiece of the evolutionary approach is the self-organized development of entrepreneurial soft skills by the participants for the participants, f. e. risk-taking, autonomy, self-esteem and networking. Consequently the trainer's role is reduced to being a moderator or facilitator of the learning process amongst equals. Achievement motivation is enhanced by action learning methods, organized by the participants mainly as team-work (Marsick & O’Neil, 1999, p.159). Action learning means to turn the traditional learning paradigm at upside down. Instead of university learning – 'tell-know-do'- the message is 'do-know-tell. Depending on the specific environment, target groups, trainers, learning culture and available resources in practice often a ‘mix’ of both approaches exists. Therefore it was rather difficult to identify and especially to quantify the respective components of the applied approaches.

**Results and Discussion**

The exact identification of the impact of entrepreneurship training programmes – irrespective of the approach applied – is difficult because of two obvious reasons:

- The start-up and the survival-rates (to give an example) can be dependant on the growth of the economy, the development of demand, the access to credit, the existing regulatory regime etc. Therefore it is nearly impossible to isolate the effects of training from other variables. The impact of training programmes is often weaker than their societal environment.
- Some results of training, and even more so impacts, may only be identifiable after several years of the training.

**Container education.**

The result of our evaluations of conventional container education vary substantially, predominantly depending on the economic environment, culture of entrepreneurship, target group and trainer's competences. From an analytical perspective it is important to distinguish between different levels of evaluation (for details see: Davidsson & Wilklund, 2001, p. 81). Furthermore, subjective judgements of the evaluators are necessary, when the evaluation results are ‘mixed’, i.e. positive findings on individual levels and negative ones on firm levels; i.e. achievement motivation increased – but the person did not start a business.

Generally speaking our evaluation of container education does come to negative or very moderate result, irrespective of the level evaluated.

On the personal level the participants complained that conventional training de-motivated them, as the training tried "to turn dynamic and motivated personalities into bookkeepers" (one female respondent). Being more academic and theoretically biased the programmes often were very far away from the real needs of potential entrepreneurs. The dominant methodology of front-desk teaching without activating the participants was felt to be non-entrepreneurial. It produced – if any – competencies which were the opposite of entrepreneurial behaviour. “After the training I knew more about the business, but was less motivated to start a new business” In addition the programmes very often focused on existing and bigger companies without adapting to the needs of start-ups and micro-entrepreneurs.
Table 5
Entrepreneurship Education Results in Comparison

<table>
<thead>
<tr>
<th>Micro Levels</th>
<th>Container Education</th>
<th>Competence Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Level (PECs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Achievement Competencies</td>
<td>De-Motivation</td>
<td>Increase of Achievement Motivation</td>
</tr>
<tr>
<td>• Planning Competencies</td>
<td>30 – 40%</td>
<td>50 – 80%</td>
</tr>
<tr>
<td>• Power Competencies</td>
<td>Security Maximizing</td>
<td>Increase of Risk Taking</td>
</tr>
<tr>
<td></td>
<td>45 -55%</td>
<td>40 – 60%</td>
</tr>
<tr>
<td></td>
<td>Decrease of Self-Confidence</td>
<td>45 – 55%</td>
</tr>
<tr>
<td></td>
<td>Enhancement of Management Knowledge</td>
<td>60 – 80%</td>
</tr>
<tr>
<td>Programme Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Rate of Absenteeism</td>
<td>30 – 50%</td>
<td>10 – 20%</td>
</tr>
<tr>
<td>• dropout Rate</td>
<td>40 – 60%</td>
<td>5 – 10%</td>
</tr>
<tr>
<td>• Motivation</td>
<td>to get a Certificate 100%</td>
<td>to start a Business 50 – 80%</td>
</tr>
<tr>
<td>Firm Level</td>
<td>8 – 15%</td>
<td>31 – 66%</td>
</tr>
<tr>
<td>• Start-up-Rate</td>
<td>4 – 10%</td>
<td>25 – 38%</td>
</tr>
<tr>
<td>• Survival Rate</td>
<td></td>
<td>2 – 3</td>
</tr>
<tr>
<td>• Additional Value-Added</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>• Additional Jobs created</td>
<td>Insignificant</td>
<td>1.5</td>
</tr>
<tr>
<td>– Males</td>
<td></td>
<td>Imitation</td>
</tr>
<tr>
<td>– Females</td>
<td></td>
<td>Adaptation</td>
</tr>
<tr>
<td>• New Products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• New Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meso Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggregates</td>
<td>Insignificant</td>
<td></td>
</tr>
<tr>
<td>• Industry</td>
<td></td>
<td>Manufacturing</td>
</tr>
<tr>
<td>• Region</td>
<td></td>
<td>Crafts (Males) Masonry / Carpentry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trade (Females)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Service (Repair)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Food</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Informal Sector</td>
</tr>
<tr>
<td>Macro Levels</td>
<td>Additional Taxes / Foreign Currency / Reduction of Unemployment</td>
<td></td>
</tr>
<tr>
<td>Aggregates</td>
<td>Rate of Self-Employed / Youth Entrepreneurship / Associations</td>
<td></td>
</tr>
<tr>
<td>Macro-Economy</td>
<td>Insignificant</td>
<td></td>
</tr>
<tr>
<td>Society</td>
<td>Female Entrepreneurship / Ethnic / Religious Groups</td>
<td></td>
</tr>
<tr>
<td>Culture</td>
<td>Renewable Energy/Re-Cycling</td>
<td></td>
</tr>
<tr>
<td>Ecology</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
On the programme level absenteeism of participants is wide-spread (which the programme management tries to reduce by giving daily allowances, free accommodation, transport subsidies etc.) and the drop-out rates reach up to 60 percent. Very often (up to 100 percent) the motivation to attend a conventional entrepreneurship training is to receive a certificate (preferably from an International Donor Agency) or to get a credit/venture capital from the banks (which often demands a certificate as collateral/security) – not to start a business.

Consequently the start-up rate of those few participants who successfully finish the course is very low – varying between 8–15 percent. The survival rate of those who found a business is very difficult to assess and analyze. According to ILO the survival rate of start-ups is defined of firms still existing 5 years after founding.

Considering all negative factors/results (low start-up rates predominantly in the micro-enterprise sector) it is not a surprise that on the regional/macro-economic level the additional income, employment, value added, taxes generated is marginal or can be completely neglected.

To sum it up: Conventional container education seems to be a failure on all relevant impact levels sometimes even a disaster. This is especially true if we take into account the cost-benefit ratio. Costs are relatively high, benefits are very low.
Entrepreneurial competence education.

Compared with container education action-learning (and competence) programmes generally seem to have a significantly higher positive impact on all three levels analysed.

On the individual level the vast majority of participants acknowledged the action-learning methodology, achievement-motivation approach and self-organised learning procedures. Concerning attitudes and behaviour the enhancement of entrepreneurial competences like self-confidence, creativity, initiative, risk-taking were mentioned. In addition the knowledge to develop and present a business-plan, to carry out a financial analyses and marketing concepts, to organise networks were referred to.

The evaluation of similar European Programmes come to comparable results: "Most of the participants felt more confident about their entrepreneurial ability after the programme had finished, than before it had commenced" (Henry, Hill & Leitch, 2002, p.3). One interesting side-effect' (an unintended but positive consequence) of evolutionary entrepreneurship education is that those participants who did not found a business argued they could use their newly acquired competencies to improve their daily life and/or job situation as dependent employees by becoming more intrapreneurial.

On programme level the most impressive results are:

- Low drop-out rates (between 5 – 10 percent),
- high start-up rates (between 31 and 66 percent), depending on the macro-economic environment, sector, product etc. As with conventional container training the best results were gained in Asian countries and amongst women in the service sector.
- The majority of start-ups (50 – 60 percent) take place in the trade, craft and service sector (because of the lower amount of venture capital needed compared with the manufacturing sector).
- The start-ups are mostly micro-enterprises with only the entrepreneur, sometimes supported by family members.
- With intervals after training the start-up rate first increases (between 1 and 9 months after training), and after that decreases again.
- Women predominantly found a business in the service sector (retail trade, sweat shops, snack bars) due to the fact that in these sectors/branches they need less venture capital.
- Men prefer the small manufacturing and trade sector (metal workshops, carpentry, masonry/bicycles repair, etc.)

With respect to the impact of entrepreneurship competence education on regional level:

- Additional 2 – 3 jobs have been created on average, including family members and relatively often part-time or seasonal jobs.
- The (additional) employment effect differs significantly between the sexes. Male entrepreneurs – although their start-up rates are lower – created 3 workplaces per newly founded business on average, females only 1.5 jobs. Reasons for the lower employment effect are that women prefer to found only a micro-enterprise because of difficulties to get a credit, risk-aversion and gender discrimination by law or officials.

Macro-level effects can be additional taxes and foreign currency generated by start-up companies, effects on the rate of self-employment, youth employment and socio-cultural effects on female entrepreneurship, and on special religious and ethnic groups. Unfortunately it is nearly impossible to identify potential effects on macro-level, because training programmes always cover only a small minority of potential entrepreneurs, compared with the total number of entrepreneurs in the region. Our evaluation of entrepreneurship training in Kenya for example comprised 88 participants – and local
stakeholders estimated the number of entrepreneurs in the region being 27,000. One important, but generally neglected effect of successful start-up programmes is their potential crowding-out effect.

Where there is light, there are shadows.

The strengths and weaknesses of entrepreneurship competence education are listed below in Table 6.

Table 6
Strengths and Weaknesses of Entrepreneurship Competence Programmes

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence-oriented learning concept</td>
<td>very expensive</td>
</tr>
<tr>
<td>participatory approach</td>
<td></td>
</tr>
<tr>
<td>action learning methodology</td>
<td>ordinary people cannot afford it</td>
</tr>
<tr>
<td>situational orientation</td>
<td>too pedantic</td>
</tr>
<tr>
<td>encounter with successful entrepreneurs</td>
<td>lack of follow-up-programmes</td>
</tr>
<tr>
<td>opening up to others</td>
<td>too much time is spent on Achievement Motivation</td>
</tr>
<tr>
<td>High learning impact</td>
<td>(people are already motivated)</td>
</tr>
<tr>
<td>using the creativity of participants</td>
<td>lack of financial support aspect</td>
</tr>
<tr>
<td>importance given to the personal factor</td>
<td></td>
</tr>
<tr>
<td>determining personal entrepreneurial competences</td>
<td>too rigid</td>
</tr>
<tr>
<td>through business simulation</td>
<td></td>
</tr>
<tr>
<td>can train illiterates and people with little or no education</td>
<td>Doesn't respect differences in culture/religion/sex</td>
</tr>
</tbody>
</table>


- Although the mobilising and achievement motivating impact of action learning is highly esteemed, even the demand-oriented approach is valued as being ‘too rigid’ and ‘too pedantic’ (which means, that there is a strong element of a supply-sided training package in programmes evaluated).

- The motivating impact of action learning can produce counter-productive results, if graduates present their business ideas and plans to conservative and risk-averting bankers, who refuse to give credit to the start-up entrepreneurs.

To sum it up: Although the results of action-learning training differ substantially between countries, economic environment, branches and target groups, the positive impact of evolutionary entrepreneurship education seems to be significantly higher compared to container education.

Cost-Benefit-Analysis

Cost-Benefit-Analyses of training programmes – although from an economic point of view indispensable – are the exception, not the rule. Reasons might be: (1) data and information which are necessary are not available; (2) evaluators do not have the necessary competencies; and (3), funding agencies are not interested in accurate cost-benefit-calculations.

Our comparative cost-benefit-calculations come to the following results:

- Pilot programmes are much more expensive than running programmes because of economies of scale.
- Programmes with international trainers/facilitators are specifically expensive because of high man-day rates (+ air fares, daily allowances)
- In the same country with same number of participants and same duration cheap and expensive programmes do exist.
- Programmes are normally highly subsidized. If participants have to pay fees – in cash or kind – they do not cover the costs.

**Intercultural Comparisons of Entrepreneurship Education Impact**

Depending on the specific environment, target groups, trainers, learning culture and resources available, in practice there often exists a ‘mix’ of both approaches. Therefore it was rather difficult to identify and especially to quantify the respective components of the applied approaches – and their impact.

Irrespective of the specific training approach, the following results (which should not be generalized) are interesting:

- The impact of training, especially on start-up-rates is highest in Asian countries, which might be explained with a more conducive environment, and/or higher achievement motivation of participants, and is lowest in African countries.
- In hostile environment (corruption / exploitation) not starting a business is rationale.
- Differences in the training impact within countries are often greater than between countries, depending on the trainer, ethnic and religious background.
- The start-up rates of women are on average lower (41%, men: 46%) – but the sustainable rate of their business is higher (38%, men: 26%). Maybe women are more cautious (or realistic or risk-avoiding), but are more persistent in their activities.
- Men prefer to start a business in the manufacturing / crafts sector, women in the trade / service sector which can be explained by the fact that trade needs less capital – and to gain access to credit is more difficult for women.
- There is a negative correlation between formal educational status and start-up rates. The higher the educational qualification, the lower the start-up-rate. (start-up rate of university graduates 29%, primary school levers 40%).
- The propensity to start a business increases with increasing age, 4% of starters are under 26 years – but 43% are over 35 years.
- Participants with an entrepreneurial family background (father / mother run a business) have significantly higher start-up rates (53% compared with non-entrepreneurial background 39%).
- Trainers with practical entrepreneurship experiences produce better training results than academic trainers with no entrepreneurial background.

A comparison of the two different entrepreneurship education approaches comes to the following results:

- Container education – ‘filling up’ participants with knowledge – decreases entrepreneurial spirit.
- Evolutionary action learning training is higher estimated than the lower educational qualifications and social background of participants.
- The introduction of action learning methods occurs in learning cultures in which memorizing / not discussing / not problem solving dominates more than container education.
• The higher the formal education of participants (e.g. university graduates), the more difficult it is to introduce and implement action learning methodology.
• The younger the participants, the easier it is to apply action learning.
• Women are more open to ‘unconventional’ methods of training (e.g. self-organized action learning).
• The higher the formal education of trainers (e.g. PhD graduates), the more difficulties they find to apply participatory training methods.

Problems and Lessons Learned

Unfortunately only very few evaluations do exist which meet scientific standards and which are representative and objective (if this is possible).

General problems of – more or less – all evaluations of training programmes seem to be:

Methodological problems.

Missing ex-ante and ex-post analysis.

A precondition for the evaluation of the effects of training is a thorough ex-ante analysis of skills, qualifications, competencies before the training started – and then to compare it with the ex-post achievements after the training. Otherwise it is impossible to evaluate the results and the impact of training. This analysis is normally not done, often because of a lack of time, of resources or of the tools needed. Especially the ‘measurement’ of non-measurable competencies (team-work, risk taking etc.) is a challenge for evaluators.

Missing control groups/ comparative analysis.

In order to assess the impact of a programme or project it is necessary to analyse what would have happened without the project, i.e. in our case we have to compare results with and without training. Would start-up and survival rates been lower without training – or even higher?

To answer this question a research design is needed with identical control groups (same socio-demographic variables, age, sex, family background, formal education etc.), inter-cultural comparable and long-term oriented. Unfortunately this kind of research is the exception, not the rule. Lack of resources, lack of qualified manpower and lack of time are the most limiting factors. Although entrepreneurship education is a growing industry, especially in transition and transformation countries, and although some projects spend millions of Dollars / Euro for the implementation of training courses there are few resources available (in cash and kind) for systematic and thorough evaluations of these projects.

Use of inappropriate indicators.

Because of a lack of data, contradictory definitions, reliability of indicators etc. the most important methodological problems of evaluations seem to be:

• Use of inappropriate indicators: Very often programme managers and evaluation teams tend to use input indicators in training programmes (amount of money, numbers of personnel, equipment), not impact indicators. Not the money spent is of relevance (except in the context of a cost-benefit analysis) but the impact of a project on the beneficiaries and on society.
• Preference for quantitative indicators. As the access to quantitative data (numbers of participants, start-up rate etc.) normally is easier, there is the tendency of evaluators to only...
use quantitative indicators. Especially in training programmes which aim at the change of attitudes and behaviour the use participants as numbers (‘head count’) is misleading. Qualitative indicators which try to assess the development of entrepreneurial competencies – like increase of initiative, risk-taking, self-esteem – are in this case much more meaningful.

**Lack of intercultural comparisons.**

Intercultural comparisons of entrepreneurship education programmes can be very productive, because they allow to identify differences in cultural values, attitudes and behaviour, influenced by religion, ethnicity, and history. But from a methodological point of view they are very demanding as well. This might be one reason that we do have only very few evaluations which are based on intercultural comparisons. Differences in definition (‘survival rate’, ‘sustainability’), translation (‘entrepreneur’) and in connotation (‘entrepreneurial spirit’) are of specific interest. Sometimes the same words do have different meanings in different cultures – and sometimes the same meaning is articulated in different words.

**Missing cost-benefit-analyses.**

For measuring the effectiveness of a programme (‘are we doing the right things?’) and the efficiency (‘are we doing things right?’) a calculation of the costs and benefits of the training is a precondition. To determine the costs/expenditures is relatively easy. Nevertheless many cost calculations neglect opportunity costs, overhead costs (for administration, organisation, communication, personnel of the implementing agency) and the personal contributions of the participants in cash, kind and time. Dependent on the selection and valuation of components the cost calculations (on the input side) may vary substantially. Even more difficulties arise from the calculation of the – direct and indirect – benefits of training programmes. This is especially relevant for benefits which are immaterial – and therefore not calculable, like the increase of entrepreneurial spirit after training, initiative and risk-taking. These effects can be much more important than calculable benefits, and neglecting them would be misleading. With respect to quantifiable benefits we do have to distinguish between direct benefits – like direct additional income, employment, value added – and indirect benefits for suppliers and buyers. The indirect forward and backward-linkages are difficult to determine and to calculate – but these multiplier effects have to be included to get a complete picture.

Despite of these difficulties to calculate costs and benefits of training programmes they have to be carried out, otherwise the efficiency and the effectiveness of such programmes and their comparisons cannot be determined.

It is needless to say that the costs and benefits of evaluations have to be calculated as well.

**Problems of impact analysis.**

The exact identification of the impact of entrepreneurship education programmes – irrespective of the approach applied – is very difficult because of four obvious reasons:

- the start-up and the survival-rates (to give an example) can be dependent on the economical growth, the development of demand, the access to credit, the existing regulatory regime etc., i.e. from the environment beyond the horizon of the training project. Therefore it is nearly impossible to isolate the effects of training from other ‘environmental’ variables.
- Some results of training, and even more so impacts, may only be identifiable several years after implementation. Only longitudinal tracer studies – which are difficult and expensive – can determine these impacts.
- The same is true for the determination of sustainability. The International Labour Organisation (ILO) defines a project as being sustainable if it still exists 5 years after the
foundation. Especially in highly mobile societies it is difficult to trace the entrepreneurs after such a long time.

- Very often a thorough follow up and systematic impact monitoring is missing, i.e., the implementation of the recommendations into practical actions are neither followed up by the evaluators nor by the project management. Therefore in many cases the evaluations don’t have any impact at all.
- Potential crowding-out effects of successful business start-up training are being neglected, although theoretical considerations and empirical evidence demonstrate that these effects do exist.

**Political problems.**

**Lack of interest in evaluations.**

Even 'soft' evaluations (without comparable control-groups) are the exception, and not the rule. With regard to very import impact indicators like 'start-up'-rates, 'success-rates', 'survival', 'sustainability', 'cost-benefit'-effects we often have to rely on *guessimates*. Oza (n.d., p. 4), an Indian analyst, comes to the conclusion: "The far-most among these problems is the absence of any machinery and the failure to provide some built-in procedure to regularly monitor and periodically evaluate the results of every Entrepreneurship Promotion Programme (EDP)". Training institutions are – by culture and function – interested in maximizing the number of courses and participants (‘head count’), only to a lesser extent in 'what happens after the training', i.e., in start-ups, survival-rates, sustainability, additional employment and income generated. On the contrary, they fear – not without reason – that negative results of evaluations lead to budget cuts, release of personnel or – in the worst case – to the closing down of the institution.

Normally there exists no correlation between the success rate of a project (whatever defined) and the allocation of resources, and therefore no incentive exists to improve the project. "As for the EDP conducting organisation, it is immaterial and inconsequential whether a potential entrepreneur….actually becomes or tries to become….an entrepreneur in a reasonable period after the completion of training" (Oza, n.d., p. 7).

Often even financial supporters (clients or customers of evaluations) of training programmes, ministries or international organisations, are not really interested in objective assessments and evaluations. Negative results mean – at least – a 'loss of face', budget cuts in the competition over scarce resources or an unintended/unplanned budget surplus if the training project has to be stopped. A budget surplus is in many organisations as worse as a deficit, because it creates problems of spending money appropriately in a given time. Therefore institutions – to say the least – are very hesitant to commission objectives and neutral evaluations. Very often results and recommendations which are not in the interests of the client are selectively interpreted or even suppressed by the relevant institution or the project management. Positive results are being emphasized, negative results heavily criticized by the client. In the worst case the final evaluation report and the draft of this report differ substantially.

**Dependent evaluators.**

Besides games played by people and organisations being evaluated, several forms of “evaluation corruptibility” exist (Morra Imas & Rist, 2009; Fitzpatrick, Sanders & Worthen, 2004). Specific problems may arise out of a ‘special relationship’ between the funding organisation of the evaluation and the evaluators. If the evaluators are financially dependant on the funding organisation – i.e., if they are working as private consultants for a few clients – there is the danger, that evaluations are not objective and neutral, but develop a ‘look-good-avoid blame’ mindset.
Recommendations

Based on our practical experiences, we propose the following:
1. With respect to entrepreneurship training programmes the development of an evaluation culture is necessary.
2. Evaluations should aim at learning between equals, not at control from above.
3. Evaluations should be participative, including relevant stakeholders, and integrating internal and external evaluators.
4. Evaluations should be intercultural, combining different disciplines and perspectives.
5. Evaluations should aim at assessing the impact, not the input of programmes.
6. Evaluations should try to assess the impact of training programmes on different levels – from the individual to the macro-level.
7. Evaluations should try to assess quantitative and qualitative results, not only the quantitative or only the qualitative impact.
8. Evaluations always should try to include a cost-benefit-analysis of programmes.
9. Evaluations should include a long-term impact monitoring, concentrating on the sustainability of effects.
10. Evaluation should try to apply an intercultural approach and include longitudinal tracer studies.
11. Evaluations should be endowed with sufficient resources (finance, manpower and time).
12. Evaluators should be financially independent from the client.

At present evaluations which fulfil these standards are the exception, not the rule.
This sobering insight says nothing about the quality of entrepreneurship education programmes, but much about the quality of their evaluations.

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From Container Knowledge to Entrepreneurial Learning
The New Role of Universities in Promoting Entrepreneurship

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Abstract

The new quality of international competition has changed the traditional functions of universities dramatically. They have to become – in addition to their classical role as sources of academic knowledge, research and intellectual capital – agents of innovations, enhancing regional development and international competitiveness. The transformation of university produced knowledge into market-oriented innovations depends – amongst others – on the quality of academic entrepreneurship. The paper analyses two competing approaches to promote academic entrepreneurship education in European universities: the “knowledge container” and the “entrepreneurial learning” approach and their foundations in neoclassical and evolutionary growth theory. The container approach applies input logic while the entrepreneurial approach is based on action learning or evolutionary output logic. The contribution combines empirical social research, using a mix of quantitative and qualitative methods, and practical experiences in the Baltic Sea Region (Finland, Denmark, Estonia, Lithuania, Poland, and Germany). The obstacles to introduce entrepreneurial learning programmes as sustainable innovations are being analysed (non-innovative university structures, risk-averting culture, history, attitudes, bureaucratic regulations and defence of vested interest in universities). The contribution finally discusses some conditions for successful academic entrepreneurship education programmes and tries to define some benchmark criteria.

Keywords: Academic entrepreneurship education, corporate university entrepreneurs, entrepreneurial universities as learning organisations, entrepreneurship education as cross-section competencies
Background

The Renaissance of Entrepreneurship in the Age of Neo-Liberalism

The current renaissance of entrepreneurship is neither accidental nor without reason. At least three developments contributed to the revitalisation of ‘the’ entrepreneur and the promotion of entrepreneurship with the objective to create an entrepreneurship culture in competing regions.

1. With the collapse of the Soviet empire, the neo-liberal model of market economy succeeded worldwide (except in North Korea and Cuba) – and especially so in the former communist command economies of Middle and Eastern Europe. Heart and centre of the market model is the dynamic entrepreneur, who with his innovative actions sets off a process of “creative destruction” (Schumpeter, 1924, p. 483) advancing economic development to the avant-garde level.

2. Parallel to the victory of the entrepreneurial market model, globalization – although in the history of mankind not a new phenomenon – developed a historically unprecedented new dimension. New actors like the BRIC-countries (Brazil, Russia, India, China) and new institutional arrangements like the World Trade Organization changed the international economic system substantially. Economic power became increasingly multi-polar and it is essential for nations and regions to produce goods and services that are globally competitive. These are the non-negotiable requirements of contemporary economics.

3. One of the most important consequences of globalization – driven by a permanent revolution in information technology – is that knowledge, its creation, accumulation, and dissemination has become the driving force for sustaining competitiveness and growth. In today’s world, characterized by intense international competition and rapid technological change, the key of development is highly qualified human capital, producing knowledge-intensive goods added with high-value. In short: Modern economies are knowledge-driven. But: an excellent qualified workforce is necessary but not a sufficient condition for progress and prosperity. The workforce has to be employed in enterprises whose members have entrepreneurial spirit, the motivation, and the capacity to innovate and sell new products with an up-to-date technology in domestic and international markets.

The Contribution of Universities to the Creation of Entrepreneurial Regions

Contrary to the visions of the two famous cosmopolitans, Adam Smith and Karl Marx, globalization did not lead to worldwide homogenous production functions. On the contrary: A new international hierarchy of regions developed with science cities, innovative milieus, and knowledge-intensive urban clusters on top, attracting the highly mobile creative class (Florida, 2002) and entrepreneurial talents, and backward regions (mainly agricultural or old-industrialized) on bottom with outward migration, aging population, and low-skilled manpower.

Regionalization of the present global order and the transformation to knowledge-based societies changed traditional functions of universities – at least in ‘Old Europe’ – dramatically (Braun, 2007, p. 1-40). In addition to their classical role as sources of academic knowledge universities have to become research and human capital agents of innovation, enhancing competitiveness of regions, enterprises, institutions, and individuals. This is particularly important as the intellectual technology of the 21st century is based on a new “axial principle” (Bell, 1976, p. 29): the appliance of knowledge onto knowledge. The transformation of university-generated knowledge into market-oriented innovations depend – amongst others – on the quality of academic entrepreneurship.
Making schools of higher education - the engine of entrepreneurial regions- is derived mainly for three reasons:

- The appliance of university knowledge, i.e. the transfer of inventions into innovations, depends mainly on tacit or implicit knowledge. As it is difficult to transfer this personally embodied tacit knowledge, it seems logical to enable the creative class of universities (researchers, developers, scientists, academic staff, and students) to become knowledge-based business founders and entrepreneurs by developing their entrepreneurial competences. “To make this happen requires profound change in the training of students and scientists, especially in the realm of skills and competences in order to set up companies as carriers of innovation” (Röpke, 2002, p. 3).

- The transfer of university-generated knowledge through academic entrepreneurs plays a strategic role for the competitiveness of a region. Because of the immense importance of knowledge networks and innovative milieus, universities often have a regional monopoly in the training of highly qualified human capital, high-tech entrepreneurs, and creative talents.

- Schools of higher education do not only play a decisive role in the development of human capital, economic growth, and regional knowledge. They contribute to demographic change, to social capital and – last but not least – to the cultural capital of a region by generating innovative milieus and attracting (inter-)national high potentials.

Consequently, the “University of the Future” lives through a structural coupling to its surrounding regional system or – to put it negatively – if universities do not become agents of innovation and entrepreneurship, they hamper national development and international competitiveness.

**The University as an Engine of Entrepreneurial Competences – A Contradiction?**

At the beginning of university-based entrepreneurship education the question needs to be raised how one can solve the paradox that the propensity of students founding a business is higher at the beginning of their academic studies than at the end. In order to understand the entrepreneur as an innovator who introduces a process of “creative destruction” (Schumpeter, 1924, p. 483), we need to take on risks and insecurity means in order to ask for the opposite of competences that universities educate nowadays. The top-ranking universities aren’t an exception of this either. “I think about 70 % of the courses in Harvard are useless. You know less when you finish than when you started” (Gilder, 1997, cited in Röpke, 2002, p. 307). To study at university is intended to give the student the time to build up a steady, lecturer-generated systematic cognitive knowledge. Ideally, this knowledge is presented in a curricular manner and cleared of all dimensions of not-knowing. “You learn what there is to know…..all difficulties with knowledge, all errors in the presentation, all uncertainties in the foundation and formation are attributed to the learner, and not to the knowledge itself. Last but not least, it is implied that while studying you become more intelligent but not more stupid” (Baecker, 1999, p. 336).

But entrepreneurs learn differently. They learn faster and on their own. They learn more slowly and trust less. They can’t be lead on, not even by their peers, who claim they already know about all things. They learn in a highly selectively way- they forget a lot of things immediately and a lot of things they will never forget. They always try to keep the difference between what they know and what they don’t know and measure learning offers that they get not on an intrinsic meaning of additional knowledge but on this very personal difference between their own knowledge and the understanding of what they don’t know. They know that you become less intelligent through learning, because then not knowing anymore what you don’t know and forget what really matters: not being surprised by a lot but by a few things (Baecker, 1999, p. 336).

*In short: entrepreneurs learn differently – and opposite to traditional academic learning.*
Discussion

Education as Container Learning

In conventional entrepreneurship education at universities – which often is offered as a specialised subject next to business administration courses (examples and case studies: Kent, 1990; Klandt & Finke-Schürrmann, 1999; Erkkilä, 2000; Kirby, 2007) - a student acquires new knowledge and/or uses familiar knowledge in new combinations.

This learning concept aims at a transition from ‘less knowledge’ to a condition of ‘more knowledge’. Learning is interpreted as the systematic and progressive elimination of not-knowing, i.e. it is based on input logics. In other words: “If we fill up the participants with more resources (knowledge, management skills, finance) the output (innovations, entrepreneurial actions, start-ups) will increase” (Röpke, 2002, p. 276). The learner is interpreted as a kind of a container that has to be filled up with knowledge – and it is implicitly implied that by closing existing gaps of knowledge dynamic entrepreneurship is activated, innovative, risk-taking and better protected against errors. Container entrepreneurship education therefore aims for the acquisition of entrepreneurial knowledge with given competences; for example, to obtain the required knowledge of writing a business plan – or to define the break-even-point (Braun, 2006, p.27-42).

At this point, most of the academic entrepreneurship education programmes at European universities are based on this behavioural input-output-paradigm of container learning (Hytti & Kuopusjärvi, 2004, p. 52). The underlying rationale is: more knowledge inputs generate higher entrepreneurial outputs.

This conventional approach of entrepreneurial learning corresponds with the neo-classical concept of bare factor accumulation in macroeconomics: In neo-classical growth models with more inputs (capital, labour) produce higher outputs (goods and services). The entrepreneur is reduced to a simple coordinator for the factors of production (Barreto, 1989) – if he is not completely eliminated in favour of elegant, mathematical equilibrium models. “By focusing on equilibrium models economists assume away entrepreneurship” (Rabbior, 1990, p. 64). The entrepreneurial function of this approach is a routine entrepreneur that moves as a ‘landlord’ or ‘rentier’ in a world of a stationary circle in which he tries to use given resources in a given environment in an optimal way (Schumpeter, 1934, p. 88). In short: the routine entrepreneur lives in a stationary world of non-development.

The input-output paradigm is – theoretically and empirically – highly questionable:

- The entrepreneur is not a simple machine that produces with the help of increased inputs higher outputs. Empirical studies have shown that increased ‘knowledge’ might produce less – or even no – entrepreneurial outputs, defined as innovations, start-up-rates etc. (Authors, 1999, p. 5).

- Being filled-up with knowledge, even with business-founding knowledge, demonstrates the limits of academic knowledge-focused entrepreneurship education. To know something does not necessarily mean to learn something and especially not to do new things with the acquired knowledge. To put it differently: “Entrepreneurship can be compared with swimming – it cannot be learned in a lecture hall. Neither a football player can describe how he scores, nor can a tennis player explain how he serves” (Malik, 2000, p. 24).

- The container learning paradigm prevents that a problem beyond simple knowledge accumulation is realised or solved. Competences that make entrepreneurial behaviour – individual initiative, self-control, risk-taking – cannot be activated and stay underdeveloped.

- More so: more knowledge might even increase insecurity and prevent risk-taking activities especially in an entrepreneurial context. “….entrepreneurship education needs to remove some of the barriers that have eroded self-confidence and self-esteem, and along with them the spirit of adventure and the willingness to show initiative and take risks – the spirit of entrepreneurship” (Rabbior, 1999, p. 53).
Conclusion: Entrepreneurship container education as bare accumulation of knowledge develops no entrepreneurial competences and does not have any evolutionary economic effect.

Entrepreneurship Education as Competence Development

The competing entrepreneurship education approach is based on a constructivist learning paradigm. Contrary to the input-output paradigm it does not teach knowledge (or only to a limited extent). Knowledge on its own does not make an entrepreneur.

Constructivist entrepreneurship education aims at: (1) Acquisition of entrepreneurial competences; and (2) learning how to acquire new – learning – competences.

To learn ‘entrepreneurship’ means to develop entrepreneurial competences – and to do new things. It is about unfolding self-generated skills and increasing achievement motivation. The starting point of constructive learning is the acquisition of an entrepreneurial competence portfolio or -profile on the basis of evolutionary learning and the initiation of self-evolution.

A competence-portfolio consisting of (1) professional, (2) business, (3) social, (4) methodical, and (5) personal competences is seen as a necessary and sufficient condition for successful entrepreneurial actions and performances (Figure 1).

The development or strengthening of this competence profile is considered to be a crucial input which enhances creative thinking, risk-taking, self-awareness and performance orientation.
According to the latest international research, the need for ‘soft’ skills/ ‘soft’ competences and work attitudes like entrepreneurial thinking, performance orientation, innovative behaviour, achievement motivation has grown substantially, while the need to conduct more ‘hard’ routine tasks has declined (Winterton, Delamare-Le Deist & Stringfellow, 2005).

Specific personal competences arranged in three clusters are: Achievement competences (willingness to take risks, commitment, taking chances, persistence); planning competences (setting goals, systematic planning and controlling, well-aimed search for information) and power competences (persuasive power, confidence, net-working) (Mc Clelland, 1961). Entrepreneurial competences are then the result of learning programmes that put achievement motivation in the centre – and aims at the development of a competence portfolio consisting of ‘hard’ and ‘soft’ skills which increases the inclination to innovate.

The non-availability of this competence profile is seen as one of the main reasons for entrepreneurial failure, for innovative weakness of individuals, companies as well as whole economies. Precondition is the awareness of the student and potential entrepreneur to know both what he knows and
what he doesn’t. The one who does not know about his entrepreneurial competence deficits – and has not learned to reflect upon them – will not recognise opportunities or only too late. The skill of self-reflecting one’s own competence profile, the identification of strengths and weaknesses and the insight into the limits of own skills is the basic competence of the entrepreneur or intrapreneur (Thome, 1998).

In development theory the competence model of entrepreneurship education corresponds with the innovative functions of entrepreneurship. While innovating the dynamic entrepreneur initiates a process of “creative destruction” (Schumpeter, 1924, p.483) and breaks the stationary circle of the neo-classical world in which “the economical subjects meet with always the same, fixed and only slowly changing mentalities, the same horizon, the same methods of production, business handlings, flavours and the same customers, suppliers and competitors” (Schumpeter, 1934, p.93). Consequently, the dynamic theory of unbalanced growth, learning of entrepreneurial innovation and decision logic is identified as the central variable in the development process. The entrepreneurial competence is to realise and implement innovations in the scarceness of all scarcities that conditions all shortcomings: “We have identified the ability to make (development) decisions as the scarce resource which conditions all other scarcities and difficulties….” (Hirschman, 1958, p. 62). This insight turns the conventional neo-classical growth theory upside-down: the engine of economic development is the implementation of new combinations or innovative entrepreneurial activity. And, factors offered by the conventional theory as reasons for growth – capital accumulation, labour, technical advancements – are not the cause of economic development – but an effect of entrepreneurial activities.

**Conclusion:** “The creative spirit mobilises capital, work force, raw materials – and not vice versa” (Röpke, 1982, p. 36). And the mobilisation of the creative spirit is the utmost objective of entrepreneurship education – especially at schools of higher education.

**Many are Called, but Few are Chosen: Models of Entrepreneurship Education in University Practice**

Along with the radical reduction of complexity we now can compare the previously described competing approaches of entrepreneurship education at universities: (1) the academic container knowledge approach, based on a pedagogical input-output-paradigm – and neoclassical economic theory; and (2) the competence portfolio approach, based on a constructivist learning paradigm and on dynamic macroeconomic theory of unbalanced growth. Both differ fundamentally in their objectives, methods and learning arrangements (see Table 1). Depending on specific environment, learning culture and available resources in practice often exist in a ‘mix’ of both approaches.
### Table 1

**Container Knowledge versus Entrepreneurial Competence Education**

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Container Knowledge</th>
<th>Entrepreneurial Competences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>SUPPLY Oriented</strong></td>
<td><strong>DEMAND Oriented</strong></td>
</tr>
<tr>
<td>18. Approach</td>
<td>Content Driven</td>
<td>Process Driven</td>
</tr>
<tr>
<td>19. Focus</td>
<td>Teacher-led</td>
<td>Student-centred</td>
</tr>
<tr>
<td>20. Emphasis</td>
<td>Knowing that</td>
<td>Knowing how</td>
</tr>
<tr>
<td>21. Role of teacher</td>
<td>Expert</td>
<td>Facilitator/Fellow learner</td>
</tr>
<tr>
<td>22. Student’s Activity</td>
<td>Working alone</td>
<td>Working in small groups</td>
</tr>
<tr>
<td>23. Student’s role</td>
<td>Passive/Receptive</td>
<td>Active/Generative</td>
</tr>
<tr>
<td>24. Student’s Expectation</td>
<td>Dependence</td>
<td>Independence</td>
</tr>
<tr>
<td>25. Student’s discretion</td>
<td>Limited</td>
<td>Wide</td>
</tr>
<tr>
<td>26. Ethos</td>
<td>Competitive</td>
<td>Collaborative</td>
</tr>
<tr>
<td>27. Lessons</td>
<td>Programmed</td>
<td>Flexible, opportunist</td>
</tr>
<tr>
<td>28. Topic</td>
<td>Imposed</td>
<td>Negotiated</td>
</tr>
<tr>
<td>29. Mistakes</td>
<td>Not to be made</td>
<td>Are to be learned from</td>
</tr>
<tr>
<td>30. Assessment</td>
<td>Exams/tests</td>
<td>Profiles, results</td>
</tr>
<tr>
<td>31. View of the world</td>
<td>Right-wrong</td>
<td>Uncertainty, shades</td>
</tr>
<tr>
<td>32. Determined by</td>
<td>Exam boards</td>
<td>Local needs</td>
</tr>
<tr>
<td>33. Staffed by</td>
<td>Subject experts</td>
<td>Cross Curriculum team</td>
</tr>
<tr>
<td>34. Aim</td>
<td>Theory into practice</td>
<td>Practice into theory</td>
</tr>
</tbody>
</table>

*Source: Braun, 1997, p.7.*

As Table 1 is more or less self-explaining, we concentrate only on the most important differences of the two approaches:

- Predominantly, container knowledge is a supply driven educational ‘package’, at its best representing the art of academic knowledge in the specific scientific disciplines, irrespective of the individual learning needs, intentions and experiences of students. The entrepreneurial competence approach, however, is demand oriented. It reacts to specific needs and perceptions of the individual student; often it is more coaching than educating. Due to the fact that competence centred learning is manpower-intensive, it is normally more expensive than academic teaching except it is accompanied by self-learning didactics.

- Traditional academic education is preliminary based on the teaching of knowledge ex cathedra (where front-desk didactics are the reactions to increasing numbers of students). Basics in business administration, management, finance, marketing, business law are imposed on the students. The learner is like an empty container ‘filled up’ with supply-sided academic knowledge. Entrepreneurship education however aims at the development of a competence portfolio with ‘soft’ personal entrepreneurial traits and achievement motivation as the centrepiece. The strengthening of entrepreneurial competencies “is considered as a crucial input which enhances confidence, positive thinking and self-awareness” (Hartig, 1992, p. 1).

- The role of the trainer differs in both approaches substantially. Academic knowledge is taught by ‘all-knowing’ instructors/professors in a top-down guided and structured learning process, based on academic textbooks. Competence development is a self-organized bottom-up learning process,
accompanied by facilitators/moderators who are acting as fellow learners. The development of entrepreneurial competences is an open trial and error process which is controlled by the participants through action learning methodology, focusing on soft skill development via games, role plays etc. (Kolb, 1984, Braun, 1997; McGill, & Beatty, 1995, Weinstein, 1999; Boles, 2005, ILO/UNESCO, 2006; Haftendorn & Salzano, 2008). Action learning means to turn the traditional academic learning paradigm at schools of higher education upside down. Instead of following the path dependency of university learning – ‘tell-know-do’ - the action learning sequence is just the opposite ‘do-know-tell’.

- Depending on the specific study course container education is often a compulsory part of the university curriculum, so that students are not motivated to acquire entrepreneurial competences to start a business – but to maximize their ECTS-points and to get a university certificate. Entrepreneurial competence education very often is offered outside the academic curriculum. The participants are being selected by an assessment team on the base of their business idea and motivation to start a company. In-built ‘hardships’ like contributions in cash and kind, weekend courses, self-initiated actions contribute to a self-selection process to test the seriousness of students to develop entrepreneurial competences and – in the best case – to start a business.

**University-based Entrepreneurship Education: Lessons learned**

Training programmes that conventionally aim for the bare teaching of knowledge (container learning) deny specific conditions of entrepreneurial competence development and waste a great amount of the dynamics of entrepreneurship. This puts the development of the creative spirit and – in pedagogical terminology – learning of entrepreneurial self-compentence in the centre of entrepreneurship education.

Educating entrepreneurs is not an easy thing. On the contrary, it is more demanding, difficult and manpower-intensive than academic knowledge teaching. This is especially true as presently universities often train students to ‘obey’ and to look for dependent (not independent) employment after graduation (Amos & Maas, 2001, p. 29).

To increase the chance of being successful, entrepreneurship education ‘at its best’ should try to fulfil the following conditions:

- In contrast to traditional MBA programmes entrepreneurship education is a life-long-learning process, from ‘cradle to coffin’. The development of entrepreneurial competences starts in the family – in which children of self-employed entrepreneurs have comparative socialisation advantages to become successful entrepreneurs – continues in kindergarten and schools (school or junior firms) and ends up in tertiary and further education institutions.

- Dynamic entrepreneurs do not accept that there is a ‘right’ answer, but look for new and better answers. This view of the world should be the basis for an entrepreneurial training of students – this is a Copernican turn, because university learning aims for linear thinking and ‘right’ answers. “It is crucial to establish a program that shifts away from the focus of right answers. Not only is it appropriate to promote an attitude for looking for ‘new’ answers, but it also creates a new learning arena in which all students may come to feel that they stand on a level playing field – or at least not on an educational Mount Everest” (Rabbior, 1990, p. 56).

- Evolutionary entrepreneurship education means the conscious creation of situations with great surprises and high changing potentials. As entrepreneurs are action- and performance-oriented entrepreneurship training needs to meet this orientation of the entrepreneur through freeing the student from his role as a passive/receptive learner, creating an active and designed role in which development, planning and implementation of new ideas and new businesses can develop.

- The crucial aim of entrepreneurship education is to motivate a heterogeneous group of students and staff to develop a new view of the world and to change their learned behaviour. This change is hardly possible through monotonous front-desk teaching. On the contrary, the development of
entrepreneurial competences need a variety of didactic tools, techniques and learning arrangements in order to inspire and motivate future entrepreneurs – but also to prepare them for the fact that entrepreneurship is a high-risk hardship-job.

- Last but not least, trainers and facilitators of entrepreneurship education need to embody entrepreneurial characteristics and attitudes. Out of experience students are inspired by successful role models and want to become entrepreneurs. There are no easier available and more effective role models than the ones of entrepreneurial trainers.

Even though the evolutionary entrepreneurship education approach seems to fulfil most of these requirements, the ‘litmus’- test of competing programmes can only be passed by objective and representative evaluations (Garavan & O’Cinneide, 1994; Sheik & Steiber, 2002; Hytti & Kuopusjärvi, 2004; Henry, Hill & Leitch, 2007; Braun, 2008). Although entrepreneurship education at universities developed into a pedagogic growth industry, only a manageable size of scientific proof is available about the success of specific entrepreneurship education programmes. Especially about the outcome and impact of entrepreneurial training more vague assumptions exist than actual insights. Contrary to the conventional ‘success index’ of training institutions “the more participants the training has, the more successful it is” (so-called ‘head count’), the evaluation of entrepreneurship education has to assess the change of entrepreneurial attitudes, start-up-rates, additional jobs and income – only to mention a few indicators (for details see Braun, 2008). Strictly scientific surveys need to establish comparable control groups without training, comprise an intercultural level and include tracer studies. Even though ‘soft’ or ‘weak’ evaluations are hardly available, our ignorance about the effects of entrepreneurial training is almost unlimited. Therefore the question still is: “With all this activity, there is still the nagging question: are we doing anyone any good?” (Robinson & Sexton, 1985, p. 141–162).

From Entrepreneurship Education to the Entrepreneurial University – a German View

The production of academic knowledge and research were sufficient, to cope with the challenges of the 20th century – and to produce highly qualified manpower for dependent employment in the industrialized world.

In the past for many countries offered an abundant supply of natural resources and standardized goods and services in order to use a route to rapid economic growth and national prosperity. These times have gone.

In today’s world the challenges of globalization is the knowledge of the society’s demands for new answers for new problems. Only individuals and firms that are able to offer specific solutions for specific needs will be able to survive and grow in an internationally competitive environment. In knowledge-driven economies the accumulation, renewal and application of professional knowledge will be a necessary but not a sufficient condition for global competitiveness. As “in future everybody will be his own entrepreneur” (Beck, 1997, p. 19) the development of entrepreneurial competences like risk-taking, initiative, self-confidence and networking have to move into the centre of university education. Historically, universities – at least in Old Europe – are specialised in conveying academic knowledge of the highest standard for dependent employment. Entrepreneurship education aims for the complete opposite: Entrepreneurial competence development for self-employment.

In the long run this means: universities have to become entrepreneurial institutions (Williams, 2003). This refers to university culture, leadership, staff and students, organizational structure, and resources.

Theoretical considerations and empirical evidence demonstrate that universities which reward entrepreneurial behaviour and performance are in an organized competition: (1) between universities; and (2) within universities.
Organisational studies come to the conclusion, that entrepreneurial universities with an innovative ‘product’ portfolio do have: (1) a vision; (2) a transparent corporate identity; (3) an effective leadership, (4) professional academic staff with an entrepreneurial background; (5) decentralized organisational structures; (6) ‘flat’ hierarchies; and (7) a high degree of autonomy (Chubb & Moe, 1990).

In the long run, only entrepreneurial universities (whatever this might be in concrete terms) will be able to create effective work and living conditions which can develop entrepreneurial competences for students and staff (Kirby, 2006).
No less – but no more.

References


Professions and Public Credibility: An Assessment of a Course To Evaluate Ethics, Environment, Economics and Engineering

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Abstract

This paper reviews an undergraduate block-course in engineering that was established at Wismar University and RMIT University in the late 1990s. The course had three primary objectives: (1) to deliver an ethical and environmental framework for engineering undergraduates; (2) to actively benchmark degrees in Germany and Australia (using this course); and (3) to deliver the course in English by a native English speaker. That the course has been successfully delivered for more than twelve years is testament to its effectiveness; indeed, rather than being focused only on engineering, the course is currently offered as a multidisciplinary elective and is now taken by a wide range of students, resulting in participants developing a broad understanding beyond their chosen discipline of issues pertaining to the environment, ethics, economics and engineering. The paper analyzes the special rôle that scientists, engineers and associated professionals have in society and concludes with an assessment of some of the key ethical issues that existed in the 1990s and the outcomes of these. It then considers selected ethical and environmental issues that may arise in the next decade.

Keywords: Undergraduate education, interdisciplinary education, ethical and environmental education
Background

Professional Ethics: A Course Enhancing Critical Thinking

The Washington Accord, established in 1998, was the first of a series of international agreements to benchmark engineering education. The Washington Accord currently applies to Australia, Canada, Eire, Hong Kong China, Japan, New Zealand, Singapore, South Africa, South Korea, Taiwan, Malaysia, the United Kingdom and the United States of America. The rationale for the accord is to deliver substantial equivalence in the accreditation of qualifications in professional engineering within the signatory nations.

*Figure 1:* Motives for inclusion of ethics and sustainability within the course are very much motivated by a desire to improve the environment. There is now widespread consensus, in both the broader community and in industry, that more can be done to mitigate the deleterious effects of human activities on the biosphere.

Although Germany is currently only a provisional member of the accord, there are similar regional European accreditation agreements, such as the EUR-ACE (“European Accredited Engineering”) Project that Germany is asignatory to (EUR-ACE, 2010). An important component of these agreements is
a focus on the mandatory inclusion of ethical and sustainable practice within the curricula of all accredited engineering programmes. Not surprisingly, an underlying rationale for ethics and sustainability within the engineering curriculum in countries like Australia and Germany is particularly strong. In response to the aforementioned requirements, international benchmarking was initiated through a block-course entitled *Professional Ethics*, and this course has now been running way for twelve years at both RMIT and Wismar universities (Australia and Germany respectively).

Complementing the EUR-ACE Framework on engineering education is “Europe 2020” (Laboratoire européen d’Anticipation Politique), which articulates a plethora of ways in which we can actively move to minimize the undesirable outcomes of human activities. These include a greater appreciation of the real effects that human activity has on both the environment and on human health (EUR-ACE 2008; Europe 2020, 2010). Importantly, emphasis is placed on both “technical” and “non-technical” activities; there is also consideration of the responsibility that engineers have to minimize environmental impact and to rehabilitate degraded systems (Figure 1). Importantly, the regulations that are functional within are adhered to because they exemplify good practice, rather than simply rules to be worked into.

From the inception of the course, emphasis has been placed on analyzing the key issues that are likely to be confronted by new graduates. Since the 1990s many of these issues have changed, although some, such as environmental degradation and loss of biodiversity remain and are exacerbated. These and the new crises facing us in the 21st century will require responses that include judgment from combined ethical, environmental, economic and engineering perspectives, and they are thus within the realm of engineering.

**Course Delivery**

A number of delivery modes have been experimented with in the *Professional Ethics* course, including country-to-country video link. This approach, although novel, has been shelved for short-term due to difficulties in maintaining linkage competence. Furthermore, the time difference between Australia and Germany varies between nine and seven hours, and not surprisingly has not been found to be an inducement to bi-national classes. The most effective delivery style – in both countries, has been shown to be “live”, making heavy use of case studies, in a setting where student groups work together to solve problems arising from the various scenarios, reporting back on these to the full class, and at the close of the course undertaking assessment of their peer groups (Figure 2). The group marks allocated comprise a meaningful portion of the individual student’s final grade. One significant change in delivery style involves technology: in the 1990s, the course was delivered using 35mm diapositives (colour slides) to illustrate the cases studies. Not only was this cumbersome (e.g. in loading cassettes for projection), it was time consuming and expensive, with text-based slides having to be made off-campus, at about AUD$5.00 (€3.00) each. The use of PowerPoint has revolutionized the depiction of issues; it is quick, and once the set-up is established, is an admirably effective way to involve students. The PowerPoint presentations are also able to be loaded onto a central server that students may access prior to, during, and after class. However, PowerPoint has also become ubiquitous in the teaching environment, and can, if delivered without the need for student interaction, be detrimental to learning.

Over the twelve years, invitations to give variations of the course have been received from a number of regions: China, Fiji, France, New Zealand, Norway, Pakistan, Sweden and the United States. There has been an observation that there is surprising consistency in how students view ethical constructs, irrespective of their cultural backgrounds (Buckeridge & Grünwald, 2003; Buckeridge & Wilichowski, 2003).

When first developed, the course was delivered on a weekly basis over the entire semester; however, this was of limited success because student engagement was poor. The underlying reason for this was the nature of the topics being covered – they are not mathematical, and require focus of mind that most engineering students were uncomfortable with. A week between classes was too long to maintain
interest. The block course changed this, with full submergence in the development of moral theory, initially from a personal and then from a professional basis. The block course permitted a high level of student engagement: they worked in groups, explored case studies, and importantly debated these within their group before they defended their group’s moot before their peers. Importantly for international benchmarking, the block course was the ideal structure to successfully deliver the course annually in two hemispheres.

Figure 2: The teaching & learning environment is very interactive, with students working in teams. The final assessment involves peer appraisal.

Results and Discussion

The course has been reviewed on two occasions during professional engineering visits to accredit engineering degrees at RMIT University. The 2009 report from Engineers Australia stated that national and international benchmarking of programme content has been used to good effect… in Environmental Engineering and that the process should be widely adopted across engineering programmes.
In addition, student surveys undertaken over 2009-2010 at RMIT University show that this course scored 4.38 (out of a maximum of 5.0) for its success in developing problem-solving skills. This was the second highest score of the more than 60 courses currently running way in the School of Civil, Environmental and Chemical Engineering. RMIT University also runs a Good Teaching Scale (GTS) and Professional Ethics is one of the highest scoring courses (Table 1). Originally, concerns when the course was mandated that it would be received negatively by students (similar to that gained for communication English courses that are traditionally “service taught” by Faculty of Arts, Academics). We are confident that the decision was made not to follow this model, and to teach ethics and sustainable practice “in house” has been vindicated, i.e. success is attributed to the course being delivered by and for engineers, with the contextualization that this necessitates.

Table 1

<table>
<thead>
<tr>
<th>Year</th>
<th>GTS in Environmental Engineering</th>
<th>GTS in Chemical Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>88.2%</td>
<td>-</td>
</tr>
<tr>
<td>2007</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2008</td>
<td>90.6%</td>
<td>60.8%</td>
</tr>
<tr>
<td>2009</td>
<td>85.4%</td>
<td>82.5%</td>
</tr>
<tr>
<td>2010</td>
<td>83.2%</td>
<td>92.9%</td>
</tr>
</tbody>
</table>

Note: The GTS is calculated by adding the number of students in a course that “agree” or “strongly agree” with good teaching items as a percentage of all student responses; GTS scores range from a low of 0 to 100%. A score over 85% is considered exemplary. The current survey system has only been fully operational since 2006; years lacking data shown with a “-”. The Professional Ethics course offered at Hochschule Wismar is identical to that offered to environmental engineering undergraduates at RMIT (left-hand column). As an “out-group”, the right-hand column shows the results from a similar, but longer course that includes a shortened ethics component; this course is offered to chemical engineering undergraduates at RMIT and is delivered by three academics, each lecturing in their own field of expertise, of which one is ethics. The remarkable improvement in this course over the last three years is judged to reflect an ongoing commitment to concerns raised in student surveys such as feedback and continuous updating the lectures with current and relevant case studies. It also reflects a concerted effort to reinforce student success.

Interestingly, having the course taught in English in Germany provides a further opportunity for German students to gain exposure to both good engineering protocols and practice with delivery in English. Indeed, we are confident that the course achieves a primary objective, embodied in Goethe’s words that extol us to open a further window (in the mind) to allow more light (perspectives) to enter:

_Macht doch den zweiten Fensterladen auch auf, damit mehr Licht hereinkommt._

Johann Wolfgang von Goethe, 1832

Surprisingly the success of the course has led to its being taken as an elective by students outside the engineering discipline. This has had the agreeable outcome of encouraging participants to seek multidisciplinary solutions, further enriching the learning environment and preparing graduates for work in the multicultural and multidisciplinary workplaces to which most are destined. Another valuable outcome of running the course in both countries has been the development of student exchange opportunities – the Professional Ethics course is one mechanism through which students in Australia and Germany gain a perspective of opportunities in each other’s country. As a result, there has been a growing number of student exchanges, primarily in fulfillment of their project or practicum requirements. Staff
exchange is also a positive outcome, and can range from a brief weeklong visit to a long-term commitment to run a course such as Professional Ethics. Over the last decade, there have been collaborative projects between staff from both universities, with journal papers, books and educational texts being produced (e.g. Buckridge & Grünwald, 2003; Grünwald, Buckridge, Gulyaev & Klymchuk, 2007). A text, specially designed for the course, which includes a significant number of both Australian and German case studies, has also been published (Buckridge, 2008).

Feedback from German Students

A course assessment questionnaire is completed by all students at the close of the course. This provides an opportunity for students to rate aspects such as delivery style, relevance and language on a 1-5 scale. In addition, students are encouraged to write specific comments about their impressions of the course. Feedback regarding the most recent course (September 2010) included favourable comments on:

- The way in which concepts were clarified through the use of case studies.
- The value of the course to their future.
- The explanations of how human activity impacts upon the natural environment.
- The interesting delivery; examples used to make ideas easy to understand.
- The learning environment where positive ideas are encouraged.
- The good stories and style of speaking.

In addition, there were suggestions that the course be extended further for a few days, in anticipation that this would allow more opportunity for discussion.

Our Changing Worldviews

That the relative importance of economic, environmental and social issues we face fluctuates widely is accepted, although there is little consensus regarding how accurate predictions may be made and trends determined. In trying to model these fluctuations, especially economic and political issues, Casti (2010), concludes that changes are strongly driven by the prevailing social mood, i.e. it is how a population sees the future that will shape the future. He states that the likelihood of an optimistic future may be determined by an upward trend in the Dow Jones Industrial Average (DJIA). Casti quotes evidence of "positive mood" events as the single European Act of 1987, and "negative mood" events as the 2009-2010 Greek debt crisis, both of which are mirrored in the DJIA (Casti, 2010). His thesis is then, that we may, through exercise of optimism, help frame a positive future.

Now, if the priorities that existed in the late 1990s are reconsidered, some of the most likely predictions (Table 2) either did not eventuate (e.g. the Y2K computer system crash), or were downgraded (e.g. the ozone hole). Although the focus of Casti (2010) was on the prediction of social and financial trends, the two examples cited above required technical or environmental solutions. That both crises were more or less averted gives us pause to contemplate the real impact of the stock market on global systems.

Nonetheless, if we compare the 1999 worldview with key current concerns (Table 3), it can be shown that although some environmental problems have been mitigated through directed human activity, the overall trend in degradation of the biosphere continues with some drivers for degradation not widely apparent last century. Of the current crises, two in particular – the rise of global terrorism and climate change – have occupied much media space, and all of it has been pessimistic!

While the former crisis was not widely predicted prior to "9-11", the later, which is predicted to result in changes including violent climatic fluctuation, sea level rise, global warming, ocean "acidification", famine and increasing militarism, has had wide varied and often controversial coverage.
There has also been a commensurate drop in the DJIA, on the basis of which John Casti predicts a downward cycle of social mood until at least 2016 (J. Casti, personal communication, May 30, 2010).

Table 2
What concerned us at the close of the last millennium

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential outcome</th>
<th>Actual outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y2K Information Technology Crisis (2000) or millennium bug as a result of abbreviating a four-digit year to two digits 00.</td>
<td>Loss of data stored on hard disks (including millennium electronic clock resetting).</td>
<td>Negligible. No significant data loss; electronic clock integrity maintained.</td>
</tr>
<tr>
<td></td>
<td>Crash in the stock market.</td>
<td>No Y2K stock market crisis.</td>
</tr>
<tr>
<td></td>
<td>Run on cash from banks.</td>
<td>Extensive change in banking behaviour did not eventuate.</td>
</tr>
<tr>
<td></td>
<td>Rise of fringe apocalyptic groups.</td>
<td>Did not eventuate.</td>
</tr>
<tr>
<td></td>
<td>Dramatic increase in UVB (270–315 nm) radiation, with commensurate increase in diseases such as melanoma and cataracts.</td>
<td>Montreal Protocol (ratified in 1989) banning the production and consumption of CFCs – resulted in trends that indicate full recovery the ozone layer by 2050.</td>
</tr>
<tr>
<td>The Ozone Hole - as a result of widespread use of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs)</td>
<td>Loss in biodiversity, especially phytoplankton.</td>
<td>Use of less deleterious HCFCs undertaken in 1996.</td>
</tr>
<tr>
<td></td>
<td>Bioaccumulation in food chain with highly deleterious effects in vertebrates such as drop in effectiveness of the immune systems and decreased fertility.</td>
<td>Although legislation reduces usage, level of contamination continues to rise, especially in developing regions.</td>
</tr>
<tr>
<td>Environmental degradation through widespread use of persistent organochlorine compounds e.g. dichlorodiphenyltrichloroethane (DDT) and polychlorinated biphenyls (PCBs).</td>
<td>Exponential increase in information and impact on an already “full engineering curriculum”</td>
<td>Engineering degrees becoming more specialized, with less opportunity for electives to ensure a broad education.</td>
</tr>
<tr>
<td></td>
<td>Engineering degrees becoming more specialized, with less opportunity for electives to ensure a broad education.</td>
<td>Mitigated by widespread adoption of project-based learning and work-integrated learning, along with increased computing power and web-based learning.</td>
</tr>
<tr>
<td></td>
<td>If not implemented, a loss of confidence in the profession.</td>
<td>Reinforcement by professional engineering bodies of the need to ensure that ethical practice is a mandatory part of curriculum.</td>
</tr>
<tr>
<td></td>
<td>If not implemented, a loss of confidence in engineers.</td>
<td>Mitigated through international benchmarking, student and staff exchange.</td>
</tr>
<tr>
<td>Exponential increase in information and impact on an already “full engineering curriculum”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing expectation for engineers to accept both responsibility and accountability for their actions.</td>
<td>If not implemented, a loss of confidence in the profession.</td>
<td>Reinforcement by professional engineering bodies of the need to ensure that ethical practice is a mandatory part of curriculum.</td>
</tr>
<tr>
<td>High international mobility of engineering graduates requires consistency in education.</td>
<td>If not implemented, a loss of confidence in engineers.</td>
<td>Mitigated through international benchmarking, student and staff exchange.</td>
</tr>
</tbody>
</table>

Note: Issues that impacted upon society and engineering education at the close of the 20th Century are not always the same as we face today. Some crises failed to eventuate, while others were downgraded. Shaded portion deals specifically with issues that impacted directly upon professional engineering education. Data from Buckeridge, 1998, 1999; Buckeridge & Grünwald, 2003; Speth, 2004.
Table 3
Significant issues that currently face society and engineering education

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;The war on terror&quot; (i.e. Post 9-11)</td>
<td>Increasing reduction in individual liberty.</td>
</tr>
<tr>
<td></td>
<td>Terrorist acts result in massive retaliation; escalation of conflict(s).</td>
</tr>
<tr>
<td></td>
<td>Further social and economic polarization of humanity.</td>
</tr>
<tr>
<td></td>
<td>Increasing investment in technology to screen potential terrorists.</td>
</tr>
<tr>
<td>Climate change</td>
<td>Inability to deal with increased severity of weather; rise in sea level, scarcity</td>
</tr>
<tr>
<td></td>
<td>of potable water may lead to widespread famine, pestilence, conflict and</td>
</tr>
<tr>
<td></td>
<td>mass-migration.</td>
</tr>
<tr>
<td></td>
<td>Loss of biodiversity; widespread extinction of many taxa.</td>
</tr>
<tr>
<td>Human population growth</td>
<td>Increasing international conflict and migration; loss of biodiversity.</td>
</tr>
<tr>
<td>Continuing environmental degradation</td>
<td>Opportunities for social, economical, technical and environmental solutions</td>
</tr>
<tr>
<td></td>
<td>to rehabilitate land and to encourage sustainable resource use.</td>
</tr>
<tr>
<td>&quot;Peak Oil&quot; reached</td>
<td>Increased demand for diminishing natural resources; loss of individual freedom/mobility; increased likelihood of international conflict.</td>
</tr>
<tr>
<td></td>
<td>Increased investment in alternative energy sources; incentives for increased</td>
</tr>
<tr>
<td></td>
<td>innovation, research and development in science and engineering.</td>
</tr>
</tbody>
</table>

Note: The shaded portions deal specifically with issues that impact directly upon engineering, providing opportunities that require technological solutions. Some phenomena, such as climate change, have been seen as important issues for some time, although the current prominence of global warming was not always accepted, e.g. in the late 1970s there was concern about the likelihood of imminent global cooling (Kukla et al., 1972). Importantly, the evolution of university curricula following annual programme reviews provides an opportunity to incorporate current issues in the teaching and learning environment.

Expectations for Future Educational Benchmarking

The existence of a Memorandum of Understanding between two universities is no guarantee that collaborative systems will develop or be delivered. Rather, the success of international benchmarking is driven by the passion of individuals. The reason for the longevity of the linkage between RMIT and Wismar universities is the effectiveness of a long-term undertaking to deliver the Professional Ethics course, and it is from this “constant” that wider student and staff exchanges have been developed. Importantly the effectiveness of the course is not due to an individual. Success is derived from the willingness of individuals within the two universities firstly, to release staff and secondly to host them. The number of people who directly contribute to a course is perhaps surprising – about ten, significantly greater than an individual who physically delivers the course.

However, the likelihood that a single course can be maintained indefinitely is zero. Staff retire, or move on, and the social dynamics and interpersonal relationships that underpin the system fade or strengthen. If we reflect upon the imperatives that our profession demands of education, we may conclude that benchmarking will continue to be viewed as essential in producing good globally aware engineering graduates. We can expect that there will be changes in delivery, and if the current luxury of low-cost international travel abruptly decreases, it is likely that there will be an increasing trend to maintain links electronically. Nonetheless, humans are hard-wired to respond to physical rather than virtual presence,
and there are good evolutionary reasons for this (Buckeridge, 2009). Response to a full virtual delivery is mixed, especially when technology is unable to deliver at the desired level of sophistication. Nonetheless, the evolution of new delivery systems is remarkable, such that we can soon expect interactive holograms to be available, although how humans will respond to these, knowing that the hologram may not even have been produced by a human is, as yet, unknown.

Acknowledgments

Thanks to John Costi, International Institute for Applied Systems Analysis, Laxenburg, Austria for useful discussion on how the social mood influences behaviour. We also thank Professor Mathias Wilichowski (Hochschule Wismar) and numerous colleagues and students, in both Australia and Germany, who together have helped to make our course Professional Ethics popular, relevant and sustainable.

References


Appendix

Synopsis of *Professional Ethics* block-course structure:

<table>
<thead>
<tr>
<th>Day</th>
<th>Content</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (8 hours)</td>
<td>Student Study Groups established. Group seminar topics allocated. Introduction of value, moral theory and frameworks, relativity. Discussion of differing world-views and environmental change.</td>
<td>Formative: feedback from student discussion groups.</td>
</tr>
<tr>
<td>2 (8 hours)</td>
<td>Through case studies, evaluation of how ethical assessment is undertaken and the limitations of this. Concepts introduced: the code of ethics, conflict of interest, resource use, risk, &quot;quadruple bottom-line accounting&quot; (i.e. the 4 Es - ethics, environment, economics, engineering).</td>
<td>Formative: Application of theory to case studies; feedback and debate through student discussion groups.</td>
</tr>
<tr>
<td>3 (8 hours)</td>
<td>Interaction/interface of engineering and technology with the natural environment. Concepts introduced: biodiversity, urban growth, sustainability. Student Group Seminars.</td>
<td>Summative: by peers (25% of final grade); by faculty (25% of final grade). Student assessment of the course.</td>
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<td>4 (2 hours)</td>
<td>Evening seminar: where a relevant current issue is debated in an open session. Other faculty, students and interested members of the professions and the public are invited.</td>
<td>Formative.</td>
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<tr>
<td>5 (2 hours)</td>
<td>Written examination.</td>
<td>Summative: (50% of final grade).</td>
</tr>
<tr>
<td>6 (1 hour)</td>
<td>Awards presentation - certificates of attainment or certificates of attendance.</td>
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Innovating Higher Education Learning: Application of the Immersion Methodology

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Abstract

The orthodoxy of theoretical teaching and learning methodology in our HE systems has created a significant gap in industrial expectation of employing individuals who are creative and work ready. This conceptual paper depicts the innovative epistemology of using Immersion framework which encompass experiential student – oriented learning in HE as the tool to bridge this gap. This framework emphasizes on day to day learning by immersing students into industrial requirement, practices and challenges from the commencement of their studies. The Immersion Methodology approach modeled in Berjaya University College of Hospitality is applicable for the Hospitality industry as a whole. A challenging and continuously changing environment which surrounds the field of hospitality management requires academia to inspire and facilitate student ownership of learning experiences. This innovative methodology proposes a holistic approach that integrates academic knowledge, industrial experiences and community involvement. The industry’s expectation of its graduates was polled using a sample of 6 hotels comprising of 3 five – star hotels and 3 four-star hotels within Kuala Lumpur, as it is expected that these organizations are the most likely to absorb a larger number of hospitality graduates. This paper concludes that HE learning should evolve from the monotonous and rote form of learning to one that is innovatively aligned with industry expectations of graduate performance.

Keywords: Immersion methodology, experiential learning, employability, academic knowledge, HE learning, hospitality management
Background

Hospitality studies has seen a surge in education circles, moving from a generally TAFE orientation to one of Higher Education (HE). This surge raises interest in the manner in which the hospitality programs are delivered and whether they subscribe to the interests and needs of the industry.

The criticism often levelled at HE is that it exists on a plane that is separate from the realities of the industry and work expectations. This criticism has resulted in a review of the relevance of the hospitality curriculum to ensure that it is consistent with the demands of the industry (Turkson & Riley, 2008). While undoubtedly the curriculum plays a critical role, the delivery method of the said curriculum should also be given equal emphasis. The relevance of the curriculum may be lost if the delivery methodologies are not suitable to address the issues that are of significance to the industry. In line with these issues, this study has two main objectives: First, it determines the expectations of the industry in regards to what it expects hospitality program graduates to possess, paying particular attention to what practitioners believe the curriculum should emphasise and the attitudes the graduates should have. Second, it sets out the use of the Immersion Methodology as an innovative framework within which a more realistic methodology of education delivery may be practiced, consistent with the demands and expectations of the industry – that is reducing the gap between industry expectations and graduate skills and competencies.

Literature Review

It is a given that hospitality curriculum has the responsibility to meet the expectations of the industry as well as that of academic rigour expected by the institutions of HE (Raybould & Wilkins, 2006). The effective implementation or practice of this would firstly require an understanding of the demands or expectations of the industry and determine how these may be inculcated into the curriculum without compromising academic rigour.

Employer expectations of hospitality graduates.

Undeniably, HE institutions have a responsibility to facilitate the transition of graduates into the work environment in a manner that satisfies all stakeholders namely the educational institution itself, the graduates and the employers (Nolan et al., 2010). It is therefore important that a ‘fit’ between the educational experience offered and the industry expectation is achieved.

The dissatisfaction expressed by hospitality employers include graduate’s unrealistic expectations in regards to their careers and the types of roles that they will experience in the industry (Nolan et al., 2010; Raybould & Wilkins, 2006). They expect to be well paid and undertake glamorous assignments without realising the hard work involved in providing services to guests. Other dissatisfactions expressed include that graduates lack a positive attitude towards service, good work ethics, discipline, commitment, a sense of responsibility and respect for authority (Handel, 2003; Hart et al., 2006; Zhang & Wu, 2004). Hart et al. (2006) quoting a respondent said that graduates do not have the right skills to deal with commonplace situations. Zhang and Wu (2004) also pointed out that graduates lack the ability to cope with the pressures of the work environment such as hard work and long hours.

A recurring theme in employer dissatisfaction is the lack of ‘soft’ skills. Employers found graduates to lack sufficient interpersonal skills which includes customer handling, people or social skills, problem solving skills, team working and importantly communication skills (Hart et al, 2006; Handel, 2003; Littlejohn & Watson, 2004; Nolan et al., 2010). The dissonance between the industry expectations and those of the graduates are likely to result in greater difficulties in attracting and retaining employees in this industry.
The foregoing literature review has identified a litany of dissatisfaction expressed by employers in general and the hospitality in particular and provides an understanding of what employer expectations are. This review also helps us understand the changes or revisions that need to be undertaken so that HE institutions are not only providers of education and knowledge but also act as enablers of graduate employment.

The reality of hospitality employment is not just a mechanical or rote display of the knowledge learned in the classroom, but one that requires employees (and graduates) to be able to use their discretion in managing the context within which they find themselves (Chapman & Lovell, 2006). Literature in general has identified human relations, management and interpersonal competencies as being important (Baum, 1990; Christou, 2000; Connoly & McGing, 2006; Raybould & Wilkins, 2006). Connoly and McGing’s (2006) research indicated that managers rated people and human resource skills (which includes communication, good personality, customer service skills, supervisory and personnel skills) very highly and have a ‘...strong preference to hire people with strong practical skills and “soft” people management skills’. Tas (1988, in Jauhari, 2006) in his study indicated that competencies necessary for the hospitality industry require a ‘soft’ skills emphasis namely ‘...sensitivity to guest issues...effective oral and written communication, developing positive customer relations and striving to achieve a positive working relationship.’

It is of interest to note the preponderance of ‘soft skills’ in skills highly rated by industry practitioners. However, the experience of both industry practitioners and graduates has pointed to some criticisms of the education experience. Much of this criticism is levelled at the mismatch between the education provided and the demands of the industry. This has resulted in graduates who have unrealistic expectations of the industry and employer dissatisfaction (Nolan et al., 2010; Raybould & Wilkins, 2006; Rimmington, 1999).

The curriculum has often been singled out as the main culprit of this mismatch and researchers have proposed the used of ‘informed curriculum’ (Bartlett, Upneja & Lubetkin, 1998) and using curriculum that is reflective of industry changes (Nelson & Dopson, 1999). Given the abundance of literature that emphasises the importance of ‘soft’ skills and competencies, what is then lacking in hospitality education curriculums? There have been concerted efforts to ensure that the curriculum does reflect (as far as it possible given hospitality’s dynamism) the demands of the industry. As Jauhari (2006) posits, the academic institution and the curriculum it offers determine the nature of competence in the hospitality industry. However, it is also crucial for educational institutions to consider the implications of their teaching–learning methodologies as a possible cause of the mismatch. This understanding augmented with a more innovative and applied approach to the delivery of the curriculum augurs well for the bridging of the gap between education and industry.

The traditional teacher-centred and didactic instructions impede the implementation of more student-centred and flexible learning approaches. Coleman et al. (2003 in Alexander, 2007) highlight the need to shift from a ‘...purely practical skills to a mix of practical, leadership, commercial and transferable skills...’ The enabler of such a transition is a teaching-learning methodology such as the Immersion Methodology. As Woods and Dennis (2009) pointed out, transferable and employability competencies (achieved using the immersion approach) including non-assessed add-ons better prepare graduates for work. The immersion teaching learning approach augments the traditional teacher-led approaches to ensure a more robust application of the hospitality curriculum for the benefit of its stakeholders.

Thus, the inclusion of the immersion methodology as a framework on which not only a more enriching learning environment may be generated but also as one that responds to the needs of the industry is noteworthy.
Methodology

Research Design

The purpose of the research was to determine and describe the gap of industry expectation in employing hospitality graduates. As such, this study adopted a qualitative, exploratory research approach using unstructured in-depth interviews. This is to allow respondents to think freely and to express their feelings and experiences with respect to the expectation of HE graduate in their hotels and in the hotel industry as a whole.

In order to develop general categories of ideas and themes for discussions, the qualitative data were integrate with progressive comparative analysis (Blaikie, 2000). Data analysis was inductive, and the process held the integrity of individual perceptions, rather than attempting to prove or challenge preconceived theory.

Sampling Strategy

The research targeted senior Human Resource (HR) managers in the hotel sector within Kuala Lumpur city centre. The target response for interview was 10 and the research set out to focus on establishments with at least a four-star rating. The researchers used a convenience sampling strategy and contacted 20 hotels within Kuala Lumpur city centre, which yielded a sampling frame of 6 hotels. 7 hotels rejected the invitation, 4 unable to participate during the period of research and 3 did not respond. Despite of the limitations such as systematic bias and/or generalisation, convenience sampling was used because it allowed the researchers to obtain basic data and trends within the constraint of time and resources. It was also anticipated that with four and five star hotel and the intended target respondents of senior managers, there would be minimal differences in response. It must be noted however that responses from the sample may not be representative of smaller hotels and lodging providers and as such results of this research focus primarily on the types of hotels represented by the sample.

Data was collected from 6 individual unstructured in-depth interviews with respondents of six hotels in Kuala Lumpur city centre from May 2010 to June 2010. All respondents were senior managers in Human Resource (HR), responsible for HR planning, recruitment, and training and development. The respondents had an average of 17 years working in the hotel industry. Table 1 provides a summary of the profile of the hotels represented in the sample.

Table 1
Profile of Hotels

<table>
<thead>
<tr>
<th></th>
<th>HR#1</th>
<th>HR#2</th>
<th>HR#3</th>
<th>HR#4</th>
<th>HR#5</th>
<th>HR#6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>KL centre</td>
<td>KL centre</td>
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<td>KL centre</td>
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</tr>
<tr>
<td>Star rating</td>
<td>5-star</td>
<td>4-star</td>
<td>4-star</td>
<td>5-star</td>
<td>4-star</td>
<td>5-star</td>
</tr>
<tr>
<td>Ownership</td>
<td>International</td>
<td>International</td>
<td>Domestic</td>
<td>International</td>
<td>Independent</td>
<td>Franchise</td>
</tr>
<tr>
<td>Size (rooms)</td>
<td>473</td>
<td>320</td>
<td>302</td>
<td>426</td>
<td>239</td>
<td>561</td>
</tr>
<tr>
<td>Total staff employed (full-time)</td>
<td>76-100</td>
<td>51-75</td>
<td>51-75</td>
<td>76-100</td>
<td>26-50</td>
<td>76-100</td>
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Results and Discussion

Analysis of the qualitative data identified several hurdles that contributed to the gap of industry expectation and graduates competences who are work ready. Figure 1 illustrates the hurdles to Graduates Employability. These hurdles fell into three broad themes: “Lack of Exposure”, “Graduate Attitude” and “Soft Skills”:

Lack of Exposure. A lack of structured and effective program that provide opportunity for HE students with access to guidance from experienced hotel managers can be hurdles to graduate employability. This is because students have been criticised for having unrealistic expectations of the types of responsibilities they may be given on entering the industry.

Graduates’ Attitude. The values, beliefs, and behaviour of HE students with respect to hotel industry and work itself can all be the causes of employability gap between employers and graduates.

Soft Skills. The skills that hotel managers identified and valued, interpersonal skills, problem solving, and self-management. These competencies regarded as important in hospitality because it is related to customer service and working as part of a team, professionalism and maintaining high ethical standards.

Figure 1. Employability Gap: The hurdles to graduates employability.

![Image of Employability Gap Diagram]
The discussion identified several key issues relevant to each theme and does not intended for comprehensive discourse:

**Lack of Exposure**

The interviews revealed that upon completion of their HE studies, graduates have well-developed academic skills. Many graduates have completed a period of internship and some claim to have extensive part-time work experience. With this, they have an expectation that industry will allow them to apply the conceptual skills that have been emphasised in their studies. Graduates often perceive themselves to have already been an “apprentice” for management through a few years of study combined with the associated practical requirement of most hospitality degree or diploma programs. A senior manager with more than 15 years of experience in the hotel industry commented that:

[...] they often experience adjustment difficulties that lead to frustration, disappointment, and uncertainty as to their career choice. Meanwhile, this issue may be worsened by the fact that currently there are relatively few managers in the hotel industry who have experience of tertiary education. They may have a poor understanding of graduate’s capabilities (HR #1).

The comments also pointed out that many graduates have unrealistic expectations of the types of roles that they will experience upon entering the industry. They indicate that significant talent and opportunity may be lost by the industry because these expectations are not being effectively managed. This issue aligned to other findings in the literature, such as Raybould and Wilkins (2005).

This was confirmed by several managers who articulated the view that:

A lot of full-time courses are not placing enough emphasis on exposing students to real work environment. So they are coming out to the industry doing all of the book work but they aren’t grasping the practical parts of the business. I think this is what scares most of the graduates that come into the industry and the reason for such a high dropout rate initially in the first couple of years of graduation (HR #1, 3, 4 & 5).

Despite of the internship provided by most HE institution, the duration of internship does not allow the hotel managers to fully immerse the students to the industry as a whole. As one manager observed:

The normal duration of internship is about three months and normally takes place towards the end of their studies. To allow the students to experience the responsibilities working in the hotel, learn the organisation’s culture and expect them to grasp the feel of the industry within such a short period is not practical (HR #3).

The interviews also revealed that hotel managers tend to face difficulties in supervising and managing fresh graduates. This is because the components of work experience in most hospitality degree and diploma are primarily comprised of operational experiences and rarely do students get any exposure to management activities. Therefore, it complicates the graduates’ realistic preview of the expectations and demands relevant to their career in hotel industry.

It is thus evident that the student exposure to the hotel industry during the studies is crucial in any consideration of employing work ready graduates.
Graduates’ Attitude

Managers reported that getting the right people with the right attitude is one of the main hurdles in the industry. This is because hospitality graduates’ attitudes towards the hotel industry have observed that in general they tend to have a very unfavourable image with not being regarded as a serious and rewarding career option. The hotel industry is also distinguished to have the lowest levels of pay among the hospitality sector.

A manager expressed the view that:

“It is very difficult to get people to believe in what we do here, instead of perceiving it as just a job. As a result, the way young graduates behave at work is very much depending on how much they are being paid for (HR #5).”

Another admitted that:

“We have people who are working here, just don’t want to be here. They don’t see any future career here (HR #1)”

The greatest frustration reported by managers was that the young graduates are often unwilling to admit their mistakes and failed to understand the impact of the wrong doings to the organisation as a whole. According to a hotel manager, the graduates tend to take things too lightly and no sense of urgency to resolve the mistake made; but would expect condonement from the managers. For example:

“During a cocktail function in a hotel, a newly employed graduate took the leftover wines and got drunk. When confronted by the manager on the next day, the graduate gave reasons like; “nobody mentioned that the staff cannot drink the wines and function nearly ended”. He then casually asked for forgiveness (HR #6).”

It is therefore apparent that the graduates’ attitudes should be an important consideration when determining the employability of students in HE.

Soft Skills

There are some sizable gaps regarding competency such as the soft skills were employers are more concern with graduates’ abilities to interact effectively with customers and peers. Most of the competencies identified as important were not operational or technical, but were more generic in nature. During the interviews, strong views were expressed by employers that the emphasis should be placed on developing basic interpersonal skills, problem solving, and self-management skills during the early phases of both HE and work experience. Some managers noted that:

“These fresh grads just don’t have the self-confidence and lack of service ethics to socially interact with customers. We have difficulty to get them to talk more with our guest (HR #1).”

Another important finding from the interviews pointed out that the graduates’ lack problem solving skills. This was reflected in the statement of a manager:

“[…] many just follow through the work processes but never spend time to think of the issue; why we do things this way; how things can be done better and faster (HR #4)”
A similar opinion by another manager:

Graduates nowadays lack of ability to think critically and look for details in order to do work effectively and efficiently; what they learn in class, they just repeat it but whether the work is right or wrong, no thought is given (HR #6)

With regards to the managers’ satisfaction with how the HE institution prepared graduates for careers in the industry, the hotel managers managed to identified these of hurdles across the spectrum of employability of graduates. This is somewhat unexpected given the changes that have been made towards improving the curriculum in tertiary education in Malaysia. Hence, the ability to overcome these hurdles is a greater priority for the benefits of the employers, students, HE institutions and the hotel industry as a whole.

Conclusion

This study identified factors that generated dissatisfaction among employers and the skills that they expect students to possess upon graduation. The respondent feedback centres more on the lack of the soft skills component. Respondents were generally satisfied that the graduates are fairly competent in executing the technical parts of their job but need to improve on skills such as problem solving and communication.

The importance and role of the curriculum in hospitality has been repeatedly stressed, however little attention seems to have been given to the teaching-learning methodologies that would deliver the curriculum.

The use of the immersion methodology is aimed at enabling graduates who, during their tenure as students have been challenged from a holistic perspective – trained to ‘contribute to business development and improve the competitiveness and performance of the organisation...and contributing to the “bottom-line”’ (Connolly and McGing, 2006, p. 57) and ‘going beyond delivering good service’ (Jauhari, 2006, p. 129) – in addition to acquiring industry-specific skills. Such a methodology also facilitates the move beyond a narrow and constricting viewpoint of hospitality.

However, we recognise that the sample size is very modest but efforts are being made to increase the size of the sample. It is expected that the findings would be further substantiated using educational institution and graduate feedback.

Overall, this research aims to suggest that while understanding the dissatisfaction and expectations of the hospitality industry has resulted in changes to the curriculum, emphasis has to be given to how the curriculum is delivered so as to maximise the returns from a well designed program. Therefore, examination and improvement of the teaching-learning methodology, in particular the inclusion of the immersion methodology should be seen as necessary to enhance graduate readiness for employment.

Recommendation

The Future Critical Success Factors

Given the hurdles that exist between industry expectations and the employability of graduates, we propose the use of the Immersion Methodology in teaching and learning. The curriculum in Berjaya University College of Hospitality attempts to cultivate graduates with the knowledge, competencies, soft skills and industry exposure; in short graduates who are primed for employability in the hospitality industry.
Tan Sri Professor Emeritus Abu Hassan Othman (A. H. Othman, personal Communication, 2009) says:

“...the Berjaya Immersion Methodology puts together the conventional, action and experiential approaches to ensure a more meaningful learning experience for the students. We expect the Immersion Methodology would result in graduates who are multi-skilled, employable and entrepreneurial...”

This means that the desired outcome of the Methodology is the improvement of graduate progression into employment (Rae, 2007).

The concept of Immersion at Berjaya UCH is based on the escalation of active learning. The main drivers are knowledge acquisition, skills enhancement and industry readiness, which are embedded in student learning (Arumugam, Choe & George, 2009).

The Methodology amalgamates several of the learning approaches discussed above, which are action learning, experiential learning (through exposure to industry practices and expectations) and the conventional ‘chalk and board’ or guided learning methods. The purpose of this methodology is not about enabling students to acquire only the ‘skills du jour’ but ensuring that they develop and retain life skills that have more long term value (Alexander, 2007).

The distinctiveness of the methodology lies in immersing students into the hospitality environment from the moment they step into the campus. This is done via the infrastructure within the campus that reflects real hotel lobbies, hotel rooms, food and beverages laboratories, restaurants, cafes and kitchens. In addition, the teaching-learning pedagogy goes beyond the knowledge-based passive learning and includes applied interactive learning (Tan Sri Professor Emeritus Abu Hassan Othman, pers.comm, 2009). This is exemplified in the use of role plays, involvement in projects with industry partners and participation in competitions among others, where students are expected to acquire and use skills such as critical thinking, team-working and communication.

The Immersion Methodology leverages on the Berjaya Group’s diversified businesses in the hospitality and tourism industries to make classroom learning become more meaningful and relevant. By accessing real-life experiences through industry-academia leverages, students are more likely to place the theoretical aspects of learning into a business or work context and make sense of what they have studied (Halls, 2005). As Watt and Jones (1993) said “...by putting academic material into a job related and life enhancing formats, quicker connections are realised, firmer applications are understood and a faster rate of learning takes place...”

Immersion in Practice

At Berjaya UCH, the Immersion Methodology typically progresses in the following manner:
Phase 1 of the Immersion Methodology begins with the design of the curriculum and syllabus. The curriculum is designed to ensure that students master a particular body of knowledge in a systematic and focused manner. Faculty members will examine the existing curriculum and working with industry practitioners to make appropriate changes that reflect the current thoughts and practices of the industry. Faculty members are also expected to integrate research informed learning into their curriculum. The curriculum and syllabus is organic, that is, sufficiently flexible to allow for the adoption of necessary changes.

Phase 2 is the teaching-learning methods. Teaching-learning uses a combination of methods, the aim of which is to move away from the traditional one-way, passive learning to a more interactive and involved one. This is the stage where immersion is actually put into practice. Students are assimilated into their future industry through the use of problem-based questions, case studies, scenarios, games and practical training. To further add value to the learning experience, guest speakers from across the industry and academia are invited to showcase the opportunities, challenges and possibilities that students may look forward to. This adds the ‘outside-in’ perspective into the learning available at Berjaya UCH (Angela Thexiera, Vice-President, Academic and Administration, pers.comm, 2009).

The teaching-learning process also fosters critical thinking, reflection, research and intellectual independence. Students are the owners of learning and as such must take control of their learning. The opportunity for student ownership of learning is via the inculcation and encouragement of soft skills in the form of independent study, classroom discussions, team working and presentations into the learning process. Participation is compulsory and students are expected to contribute to the class’ overall learning experience. The rationale behind these approaches is to wean students away from the teacher-led, passive studying (sometimes referred to as ‘spoon-feeding’) to a more interactive, shared learning.
Phase 3 is the design of assessments. Assignments that are case-or-problem based provide an excellent opportunity for students to engage in critical thinking and hone their analytical skills, synthesise ideas and seek practical applications of what they have learned; assignments also encourage students to consider creative approaches to solve problems. As stated in an earlier part of this paper, soft skills such as working in teams, which requires people management skills, leadership and communication abilities are tied into the learning outcomes.

Students are not just trained in industry-specific skills but also acquire insight into the managerial aspects of their industry. In the Immersion Methodology, assessments include paper-and-pencil tests and also role plays, presentations that provide scope for the expression of ideas and effort. These methods also simulate the challenges likely to face students in their work later, such as dealing with group conflict, resolving disputes, time management and especially the ability to rationalise and justify their choices or decisions.

Thus it is evident that the synergy between the HE’s values, the curriculum’s direction and the teaching-learning methodology is likely to benefit the students both directly and indirectly.

While these efforts may appear to be common and already in practice, what distinguishes the Immersion Methodology is the manner in which these practices are put together into a coherent whole. It emphasises the transferability of skills which facilitates the learners’ successful entry into an increasingly competitive and demanding workplace. In addition, our ability to leverage on the Berjaya Group’s vast resources for practical sessions, field trips and student placements, part time work opportunities and a location which is surrounded by a spectrum of related businesses adds a new dimension where the students live their learning. They are not mere spectators but are participants in their learning process.

References


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Abstract

Leading companies in the Philippines have realized that nurturing an entrepreneurial culture through the implementation of various strategic human resource management (SHRM) practices will enhance their firm’s ability to gain competitive advantage and achieve superior performance. This study attempted to determine the degree to which various SHRM practices stimulate corporate entrepreneurship and which SHRM function is the most significant enhancer of corporate entrepreneurship (CE) in large companies in the Philippines. Findings reveal that the companies are extensively implementing different practices related to SHRM functions that stimulate CE. Employee relations, training and development, and recruitment and selection SHRM functions are found to be significant enablers of CE. Employee relations proved to be the most significant enhancer of innovation in the firms.

Keywords: Corporate entrepreneurship, strategic human resource management, entrepreneurship, employee relations
Background

The advent of globalization into the 21st century, characterized by trade liberalization, more foreign investments, mergers and acquisitions, advances in information technology, and borderless economy, has posed significant challenges to, and has led to the reconfiguration of, companies’ organizational philosophy and strategic approach to become sustainable and gain competitive advantage. In numerous large firms, the impact of globalization as they operate in the midst of turbulent environments, coupled with their sheer size, bureaucracy, complex processes, centralized control, procedural focus, resource consciousness, and hierarchy, have gradually diminished their innovative, flexible, speedy, and risk-taking efforts.

Given this predicament, these firms are now finding ways to reinvent their entrepreneurial roots to stimulate innovation, speed, and risk-taking efforts which they once had (Thornberry, 2001). Firms in turbulent environments, as against those in stable environments, tend to be more innovative, risk-taking, and proactive (Naman & Slevin, 1993). They are also confronted with the fact that global competition is so stiff that they have to undergo serious non-traditional strategy formulation and reframe their organization to avoid stagnation and to prosper long into the 21st century and beyond. Under this evolving economic environment, corporate management has realized that there are opportunities to explore and many lessons that can be learned from the experiences of entrepreneurs and entrepreneurial organizations.

These opportunities, together with other internal and external factors, led to the growing interest in corporate entrepreneurship as an organizational process that contributes to company survival and performance. There is the growing belief that corporate entrepreneurship is a vehicle towards strategic renewal and change, which will make the shift from bureaucracy to innovation (Barringer & Bluedorn, 1999; Guth & Ginsberg, 1990; Shaw, O’Loughlin, & McFadzean, 2005). Visionary companies like Sony, Motorola, GE, Hewlett-Packard, IBM, Boeing, and Walt Disney have a long track record of making a significant impact on the world around them (Collins & Porras, 2002). They have engaged in radical innovations and displayed a remarkable resiliency, an ability to bounce back from adversity through multiple product life cycles and multiple generations of active leaders.

Corporate entrepreneurship (CE) is perceived in various ways by researchers and practitioners. The literature reveals that there seems to be a considerable degree of ambiguity as to the precise meaning of this construct, as it gains momentum as a research interest among academics and practitioners, particularly in the field of entrepreneurship and strategic management in the past years.

For example, Rutherford and Holt (2007, p. 30) conceptualized CE as the “process of enhancing the ability of the firm to acquire and utilize the innovative skills and abilities of the firm’s members.” Shaw et al. (2005, p. 394) asserted that CE can be defined as “the effort of promoting innovation from an internal organizational perspective, through the assessment of potential new opportunities, alignment of resources, exploitation, and commercialization of said opportunities.” Antoncic and Hisrich (2000, p. 23) referred to CE as “a process of creation of new business ventures, and other innovative activities, such as development of new products, services, technologies, administrative techniques, strategies, and competitive postures.”

On the other hand, Sharma and Chrisman (1999; p. 12) proposed to define CE as “the process whereby an individual or a group of individuals, in association with an existing organization, create a new organization or instigate renewal innovation within that organization.” Scott, Rosa, and Klandt (1998) viewed CE as the process of stimulating innovative ideas and processes, often with a focus on wealth creation. According to Zahra (1991), CE is the process of creating new business within established firms to improve organizational profitability and enhance a company’s competitive position or the strategic renewal of existing business. Stevenson and Jarrillo (1990, p. 13) defined CE as “the ability of individuals within the firm to pursue opportunities that defines the ability of the whole organization to be entrepreneurial.”
From these seemingly diverse conceptualizations of CE, Covin and Miles (1999) have observed that the commonality in most definitions is the dimension of innovation.

**Features of Corporate Entrepreneurship**

Corporate entrepreneurship can leverage a firm’s financial resources, market knowledge, and managerial expertise to introduce a new improved product, feature, or process to market because of its access to the firm’s market and industry experience (Gaw & Liu, 2004). It has a design element to it, where the organization can decide the level at which it is entrepreneurial (Gurunathan, Krsihhnan, & Pasupathy, 2004).

Stopford and Baden-Fuller (as cited in Gurunathan et al., 2004) proposed three levels of CE. The first is “corporate venturing or intrapreneurship” which involves the creation of new businesses within an existing organization. At this level, individuals within the organization have new ideas that are funded by the organization, and have their own business venture within the organization. The second is “transformation or renewal of existing organizations”. At this level, the formation of individual business units with the organization focused on customers, internal or external, and empowering them to make decisions regarding their units, and allocating resources based on the unit’s performance. The third is “changing the rules of completion in the industry by the enterprise”. At this level, the organization as a whole behaves like an entrepreneur. The objective is to innovate the entire organization and commit resources to innovation to change the very rules of the industry.

Learning from the work of Stopford and Baden-Fuller, and other CE scholars, Thornberry (2001) developed a closely similar typology composed of four types. These four types of CE are: (1) Corporate Venturing, (2) Intrapreneuring, (3) Organizational Transformation, and (4) Industry Rule Breaking, which have a great deal of overlaps.

Corporate venturing involves starting a business within a business, usually emanating from a core competency or process. For example, Procter and Gamble has leveraged its expertise in packaging into a spin-off business that provides consulting services to Fortune 500 companies (Kenney & Mujtaba, 2007).

Intrapreneuring is an attempt to take the mindset and behaviors that external entrepreneurs have, and inculcate these characteristics into their employees. In this type, usually a cadre of corporate entrepreneurs identifies and develops spin-offs or creates an environment where more innovation and entrepreneurial behavior is evidenced. Intrapreneurial intensity in organizations can be measured using six elements such as task, organizational structure, policies, people, leadership, and culture (Hill, 2003). A good example is Siemens-Nixdorf in Germany. In 1995, they embarked on a two-year process which attempted to systematically create corporate entrepreneurs out of 300 line managers inside the firm divisions with about 35,000 employees.

Organizational transformation involves innovation, a new arrangement or combination of resources, and results in the creation of sustainable economic value. An example is Sun Financial Group, a large international insurance services firm. It found itself under increasing pressure to cut costs and improve profitability. A middle manager at the Annuity Service Center re-arranged resources in a new and different pattern which resulted in the processing of more business while at the same time drastically reducing the cost per policy.

Industry rule-bending focuses on changing the rules of competitive advantage or also called “frame-breaking change” by Stopford and Baden-Fuller (1993). This facet of CE pertains to initiating paradigm shifts within an industry. Amazon.com, for example, changed the way books are sold; and Toyota changed the rules of the game in the automotive industry by producing low cost automobiles with exceptionally high quality.

Thornberry (2001) further believed that these four types of CE share a number of common elements with one another, and with external or traditional start-up entrepreneurial ventures. These common elements are: (1) creation of something new, which did not exist before; (2) new things require
additional resources and or changes in the pattern of resource deployment; (3) learning takes place in a new thing and its implementation, which results in the development of new organizational competencies and capabilities; (4) product or service is intended to result in long-term economic value; (5) the financial returns resulting from the ‘new thing’ are predicted to be better than the returns resulting from the current deployment; and (6) increased risk for the organization because the ‘new thing’ is unproven. He therefore concludes that CE is about unusual businesses or unusual approaches to business.

Aside from the organizational design element as a feature of entrepreneurial organizations, Cornwall and Perlman (1990) identified 10 main entrepreneurial organizational culture features. These are: (1) risk tolerance; (2) respect to own activity; (3) ethics, confidence, and responsibility; (4) people; (5) emotional recognitions; (6) satisfaction with work; (7) leadership; (8) focus to customer values; (9) attention to details and finish; and (10) effectiveness and efficiency.

**Efforts that Promote Corporate Entrepreneurship**

The growing interest in CE has also shown that the literature on the factors that facilitate entrepreneurial culture in the firms is evolving. There seems to be a desire to understand more the dynamics of the process, context, and people variables to explain the firm’s ability to increase its entrepreneurial behavior.

For example, Rutherford and Holt (2007), in their empirical study on the innovativeness dimension of CE and its antecedents, used three antecedents of CE, namely: process, context, and individual characteristics. Process variables pertain to how CE is “facilitated by leaders, encompassing the specific strategies they use to encourage entrepreneurial behaviors” (p. 421). Context variables refer to those that “address the circumstances that describe the organization as it embarks on strategic renewal efforts and the diffusion of CE” (p. 421). People/individual variables are those that “describe who is being asked to engage in entrepreneurial activities, describing their general disposition, skills, abilities, and attitudes” (p. 421). They found out that these antecedents were largely effective in explaining both types of CE behaviors.

In another study, Barringer and Bluedorn (1999) examined the relationship between CE intensity and five specific strategic management practices (scanning intensity, planning flexibility, planning horizon, locus of planning, and control attribute) in a sample of 169 U.S. manufacturing firms. The findings indicated a positive relationship between CE intensity and scanning intensity, planning flexibility, locus of planning, and strategic controls.

The research of Bhardwaj and Momaya (2007) provided empirical evidence regarding the significance of organizational factors, such as reward and reinforcements, organizational flexible boundaries, intelligence generation and dissemination that enhance CE. Similarly, advancement of CE requires the integration of the effective adoption of specific organizational practices, such as decentralization of authority, participation in decision-making, cooperation, avoidance of bureaucracy and encouragement of risk taking and creativity (Hayton, 2005; Strebel, 1996).

In the study on “A System Model for Corporate Entrepreneurship” (Chen, Zhu, & Anquan, 2006), it was revealed that there is a positive relationship between the ability characteristics of the entrepreneur, personality characteristics of the entrepreneur, corporate strategic entrepreneurial management, and corporate circumstance; and the fostering of CE in companies located in China.

The linkage between the entrepreneurial orientation of established firms and the development of radical innovation was explored by Lassen, Gertsen, and Riis (2006). Through five case studies in firms involved in radical innovation, they developed three propositions which suggested that proactiveness, risk taking, and autonomy stimulate the development of radical innovation, while competitive aggressiveness does not necessarily do so. This is because radical innovations are directed towards the creation of entirely new arenas of business, where existing competitors are not present.
Moreover, enabling CE in the organization requires culture, policies, and procedures which encourage entrepreneurship (Gurunathan et al., 2004). This means having a culture where employees are encouraged to innovate, be proactive, and take risk, as well as establishing a set of policies and procedures that formally supports entrepreneurial behavior. Basically, entrepreneurial behavior is a “human” issue that cuts across individual, group, and organizational levels.

Large conglomerates like Microsoft, Google, Pfizer, IBM, Johnson & Johnson, and 3M have embarked on a journey to cultivate an entrepreneurial culture within their organizations. They have established a competitive advantage by focusing on innovation and developing new products, new businesses, and new markets. Another example is Procter & Gamble. It has just recently begun a marketing consulting firm born out of their highly developed and closely guarded consumer packaging expertise because they found out that other companies like Coca-Cola will pay dearly for this type of advice, so Procter and Gamble decided to share this data for the right price (Thornberry, 2001).

In another empirical investigation (Bouchard, 2001), it was shown that cultural orientations, such as authorizing the expression of unorthodox ideas, empowering lower level employees, perceiving change positively, are correlated with the adoption of an entrepreneurial posture. In order to reduce the mobility induced by CE, managers must monitor the motivations and expectations of each corporate entrepreneur and propose congruent rewards and incentives.

According to Kenney and Mujtaba (2007), based on insights they gleaned from scholarly articles, it is an important aspect of CE development to establish a team-based approach. He also noted that corporate entrepreneurs are essentially leaders, thus, they must avoid developing the traits of an individualistic serial entrepreneur and focus on building a strong team of internal and external stakeholders.

Finally, Antocic (2007) asserted that, in practice, intrapreneurship can have beneficial effects on the firm’s growth and profitability, both in absolute and relative terms. The results of his study revealed that firms that nurture organizational structures and values conducive to intrapreneurial activities, and which have intrapreneurial orientations, are more likely to have higher growth and profitability than organizations that are lacking such characteristics. He further stated that open and quality communication, existence of formal controls, intensive environmental scanning, and management support, organizational support, and values will all help an organization become more intrapreneurial.

Role of Strategic Human Resource Management in Corporate Entrepreneurship

Human resource management (HRM) refers to many different activities dealing with the people side of the organization. It is the modern term for personnel administration wherein its major development as a field came during the half century or so between the end of World War II and the early 1990s. It has evolved over the years from a disjointed collection of employment practices (Liao, 2005).

Kraut and Korman (1999) asserted that HRM concepts and practices arise from a complex set of forces that form the operating environment for the organizations HRM serves. They believed that the significant environmental forces influencing HRM policy and practice fall into what they called the “DELTA Forces” (demographics, economics, legal and regulatory issues, technology, and attitudes and values). When the environment is stable, many of the changes are determined by the organization itself, often in a desire to give itself a competitive advantage in attracting, retaining, and motivating employees. Sometimes the concepts and practices arise out of the company founder’s personal philosophy and preferences.

According to Noe, Hollenbeck, Gerhart, and Wright (2008), HRM refers to the policies, practices, and systems that influence employees’ behavior, attitudes, and performance. HRM includes the practices of analyzing and designing work, determining human resource needs (HR planning), attracting potential employees (recruiting), choosing employees (selection), teaching employees how to perform their jobs and preparing them for the future (training and development), rewarding employees (compensation),
evaluating their performance (performance management), and creating a positive work environment (employee relations). As cited further by Noe et al. (2008), effective HRM has been shown to enhance company performance by contributing to employee and customer satisfaction, innovation, productivity, and development of a favorable reputation in the firm’s community.

Consequently, firms realized that employers and employees must be partners in ensuring profitability, sustainability, and global competitiveness, since human capital is a critical resource in their organization. Using this human resource philosophy, successful business organizations have adopted an approach where they empower their workforce so that they could perform their tasks effectively by themselves and become high-caliber employees. Leading companies focus on their vision and redesign their organizational structures for their growth and continued existence. Their primary intervention is to encourage, support, and train to improve the competencies of their managers, supervisors, and rank-and-file employees for organizational development.

Specific examples of the recognition of the vital role of their human resources include leading business organizations, like those listed in Fortune’s 100 Best Companies to Work For, such as Google, Cisco Systems, Starbucks Coffee, Microsoft, Procter & Gamble, Nike, and American Express, which have established formal Human Resource Units and have vast experience and ability to support the growth in the number of their people and advancement of their existing employees (Edralin, 2008). Their respective human resource units have dealt with situations of large-scale entry-level recruitment or with continuing significant support to the development of first- and second-line management.

Moreover, firms listed in the 100 Best Companies to Work For have observed that beyond HR recruitment and management needs, there is also a necessity to develop short-, medium-, and long-term employee development strategies to strengthen and retain high-quality staff. This is coupled with the provision of a competitive compensation package and harmonious labor-management relations in the workplace. They also ensure that their companies are organizations where employees “trust the people they work for, have pride in what they do, and enjoy the people they work with” (Great Place to Work Institute, Inc., 2006). Similarly, employees cannot be treated as commodities to be hired and discarded but they are to be nurtured and developed (Hassan, Hashim, & Ismail, 2006).

Recent theoretical works on business strategy have indicated that firm competitive advantage could be generated from human resources. Human resources (HR) are an invisible asset that creates value when it is embedded in the operational system in a manner that enhances firm ability to deal with a turbulent environment (Chang & Huang, 2005). From this view, the company HR unit must focus on more business and strategic priorities which include team-based job designs, flexible workforces, quality improvement practices, employee empowerment, and incentive compensation (Chang & Huang, 2005). This is termed as strategic human resource management (SHRM).

SHRM is defined by Wright and McMahan (1992) as the pattern of planned HR deployment and activities intended to enable a firm to achieve its goals. On the other hand, Truss and Gratton (1994) considered SHRM as the link of HR functions with strategic goals and organizational objectives to improve business performance and cultivate an organizational culture that fosters innovation and flexibility. In both cases, SHRM is argued to positively influence firm performance. Some of these most influential best HRM practices are employment security, selective hiring, self-managed team, provision of high pay contingent on company performance, extensive training, reduction of status differences, and sharing of information (Pfeffer, 1998).

The current state of development of CE indicates that the HRM systems and practices play a vital role. The important role of HRM practices in relation to its operative functions such as recruitment, training, performance appraisal, and compensation, in fostering CE, whether as a one or according to form/type of CE level, has been investigated in the previous years (Treen, 2000; Gurunathan, et al., 2004; Macchitella, 2008).

The conceptual model which illustrates that CE involves the ability of individuals within the firm to pursue opportunities that defines the ability of the whole organization to be entrepreneurial; shows how
entrepreneurial capabilities of a firm rely on the behavior of a particular group of people, thus emphasizing the relevance of HRM practices to CE (Macchitella, 2008). Along this perspective, a number of researches have been undertaken focusing on the middle managers as key actors in cultivating CE since their position within the firm are primordial in performing formal and informal activities that promote CE (Macchitella, 2008; Kuratko, Ireland, & Hornsby, 2004; Hornsby, Kuratko, & Zahra, 2002; Floyd & Wooldridge, 1999).

Objectives of the Study

The literature survey reveals that various factors, such as rewards and reinforcements, organizational flexible boundaries, intelligence generation, and dissemination, determine the degree of CE success (Bhardwaj & Momaya, 2007) and that there are enablers, such as culture, capabilities, and control dimensions, that foster different forms of corporate entrepreneurship (Gurunathan et al., 2004).

Most of these studies on CE had been conducted in developed countries, revealing little knowledge coming from transitional economies such as the Philippines. Based on these perspectives, this study investigated the SHRM practices that enable the cultivation of corporate entrepreneurship in selected large companies belonging to the Top 1000 Corporations in the Philippines. Particularly, this research aims to answer the following questions:

1. What are the different strategic human resource management practices that stimulate corporate entrepreneurship based on the following functions of strategic human resource management: recruitment and selection; training and development; compensation; performance management; and employee relations?
2. What is the level of implementation of the different strategic human resource management practices as enablers of corporate entrepreneurship?
3. What strategic human resource management function is the most significant enhancer of corporate entrepreneurship?

Theoretical Framework

The framework presented in Figure 1 is developed to guide the investigation on SHRM practices as enhancers of CE.
In this proposed model, the following assumptions are embedded:

First, firms adhere to the philosophy that employers and employees must be partners in ensuring profitability, sustainability, and global competitiveness, since human capital is a critical resource in their organization.

Second, strategic human resource management encompasses the policies, practices, and systems that influence employees’ behavior, attitudes, and performance as viewed by Noe et al. (2008). It is a principal mechanism by which managers integrate the actions of employees congruent with the interests of the firm.

Third, strategic human resource management plays a strategic role in the firm whereby it is the linkage of HR functions with strategic goals and organizational objectives to improve business performance, as well as cultivate an organizational culture that fosters innovation and flexibility (Truss &
Gratton, 1994). This means that SHRM practices are related with competitive strategies, such as innovation, quality enhancement, and cost-reduction. It is imperative for firms adopting the innovation strategy that their employees be: (1) creative; (2) cooperative with one another; (3) able to pursue long-term objectives; (4) able to devote proper consideration to the quality and quantity of their products; (5) able to take risks; and (6) able to cope successfully with ambiguity and uncertainty (Huang, 2001).

Fourth, the focus of the SHRM practices are on the formal activities related to the functions of: (1) recruitment and selection which is any practice or activity carried on by the organization with the primary purpose of identifying and attracting potential employees; (2) training and development which pertains to a set of activities aimed to facilitate learning of knowledge, attitude, and skills among people in the organization, to improve job performance and contribute to the achievement of organizational goal; (3) compensation that covers all forms of financial returns and tangible services and benefits that employees receive as part of an employment relationship; (4) performance management which is the process through which managers ensure that employees’ activities and outputs contribute to the organization’s goals; and (5) employee relations which refers to a set of processes and procedures utilized in the interaction (e.g., communication, interpersonal relationships, participation in decision making) between the employees and the employer to attain their respective goals, while accommodating the needs of both parties.

Fifth, it is anchored on the “universalistic perspective” that strategic human resource management positively influences firm performance (Martell & Carroll, 1995).

Sixth, corporate entrepreneurship is conceptualized as “a process of creation of new business ventures, and other innovative activities, such as development of new products, services, technologies, administrative techniques, strategies, and competitive postures” (Antonic & Hisrich, 2000, p. 23). Innovation gives important expression to CE as well.

Lastly, CE contributes to organizational performance. More importantly, a corporation’s performance is improved by innovation. Organizational performance refers to both financial and non-financial indicators, such as profitability, growth, market value, customer satisfaction, and employee commitment.

Based on the earlier discussions and the above assumptions, this theoretical framework has the following propositions to be tested:

Hypothesis 1: The bundle of practices in each of the function of the SHRM is moderately implemented (x = 3.50) to stimulate CE as perceived by the employees.

Hypothesis 2: The Employee Relations function of SHRM is the most significant enhancer of CE.

Methodology

Using a descriptive research design, a survey was conducted in 28 corporations in the Philippines. The corporations were listed in the Top 1000 Corporation published annually by the Business World and they have formal SHRM functions which are linked to their business strategies were purposely chosen.

A questionnaire was developed based on the Best Employer characteristics/attributes identified by Hewitt Associates (2003) and from those practices identified by a panel of experts from Focused Group Discussions conducted by the researcher. The items in the questionnaire included the aspects on SHRM practices related to: (1) recruitment and selection; (2) training and development; (3) compensation; (4) performance management; (5) employee relations; and (6) innovation. These were translated into Filipino and were validated through pre-testing. The individual practices that have a reliability of 0.5 and above, which was generated from the One-Way Repeated Measures and Item Analysis, were the only items included in each of the SHRM function.

The survey form was accomplished by a total of 1,814 employees. The employees that consisted the total sample size were randomly selected by the HR personnel from the different units of each
company. Using a five-point Likert Scale, the respondents indicated their level of agreement or disagreement to the extent of implementation of different SHRM practices by their company. The level of rating on the SHRM practices was measured using the following conversion score: 1.00-1.83 = poorly implemented; 1.84-2.67 = fairly implemented; 2.68-3.51 = moderately implemented; 3.52-4.35 = extensively implemented; and 4.36 and above = very extensively implemented.

To test the second hypothesis, an ordered logistic regression using the maximum likelihood estimation was used.

**Results and Discussion**

**SHRM Practices and the Level of its Implementation to Enhance Corporate Entrepreneurship**

**Table 1**

**Recruitment and Selection**

<table>
<thead>
<tr>
<th>Recruitment and Selection Practices</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>The company has highly selective recruiting programs.</td>
<td>3.692944</td>
</tr>
<tr>
<td>The company recruits the people based on the right fit.</td>
<td>3.712238</td>
</tr>
<tr>
<td>The company recruits people who share the same set of values and beliefs of the company.</td>
<td>3.740904</td>
</tr>
<tr>
<td>The company keeps practices across the organization mostly consistent.</td>
<td>3.690739</td>
</tr>
<tr>
<td>The company finds new workers through referrals from existing employees.</td>
<td>3.627343</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>3.692834</strong></td>
</tr>
</tbody>
</table>

There are five specific recruitment and selection practices that were rated as facilitators of CE by the employees and management. The content analysis shows that the top recruitment and selection practice based on the mean scores of the employees is “recruits people who share the same set of values and beliefs of the company” (x = 3.74). This finding indicates that the Recruitment and Selection unit of the firm has to thoroughly screen whether the applicant highly possess the same set of values and beliefs of the company.

The overall mean rating on this bundle of SHRM practices by the employees is 3.69. The test about a population mean showed a p-value of .0000 which is significant at \( \alpha = .005 \). Thus, the null hypothesis that this SHRM function is moderately implemented (x = 3.50) is rejected. This indicates that employees perceived that the Recruitment and Selection practices are extensively implemented to promote innovation. This also confirms the important function of the Recruitment and Selection unit of promoting innovation which supports corporate entrepreneurship.

**Table 2**

**Training and Development**

<table>
<thead>
<tr>
<th>Training and Development Practices</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>The employees are encouraged to take some responsibility for their own development.</td>
<td>3.915656</td>
</tr>
<tr>
<td>The company fosters a culture of growth.</td>
<td>3.794377</td>
</tr>
<tr>
<td>The company identifies its own future leaders and ensuring their development.</td>
<td>3.743660</td>
</tr>
<tr>
<td>The company promotes the people who are best equipped to meet the future demands of our business.</td>
<td>3.721058</td>
</tr>
<tr>
<td>The company invest more time in developing their managers and high potential employees.</td>
<td>3.673374</td>
</tr>
<tr>
<td>The company emphasizes on learning and development for cultural behaviours and values than technical skills training.</td>
<td>3.723815</td>
</tr>
<tr>
<td>The company provides important guidance on career opportunities.</td>
<td>3.621279</td>
</tr>
<tr>
<td>The company offers special coaching program for career development.</td>
<td>3.621830</td>
</tr>
<tr>
<td>The company implements one-on-one mentoring program.</td>
<td>3.488975</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>3.700447</strong></td>
</tr>
</tbody>
</table>
There are nine specific Training and Development practices that were rated as enablers of CE by the employees and management. The content analysis illustrates that these practices are related to investment in human capital that is necessary for their future or long-term employment with the firm. The top three practices based on the mean scores of the employees are: (1) the employees are encouraged to take some responsibility for their own development; (2) the company fosters a culture of growth; and (3) the company identifies its own future leader and ensuring their development.

The overall mean rating on this bundle of SHRM practices by the employees is 3.70. The test about a population mean showed a $p$-value of .0000 which is significant at $\alpha = .005$. Thus, the null hypothesis that this SHRM function is moderately implemented ($x = 3.50$) is rejected. This indicates that employees perceived that the training and development practices are extensively implemented to promote CE. It should be noted that CE is a mindset which could be harnessed and developed through behavioral formal training programs and followed through in the respective units of the concerned employee.

Table 3

<table>
<thead>
<tr>
<th>Compensation Practices</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>The company properly acknowledges and adequately compensates overtime.</td>
<td>3.795480</td>
</tr>
<tr>
<td>The company provides financial rewards other than salary.</td>
<td>3.717751</td>
</tr>
<tr>
<td>The company is likely to offer incentive or variable pay.</td>
<td>3.676406</td>
</tr>
<tr>
<td>The company offers flexible benefits that are tailored-fit to the diverse needs of the employees.</td>
<td>3.644983</td>
</tr>
<tr>
<td>The company gives cash incentives not only to recognize good performance but also to encourage employees.</td>
<td>3.653804</td>
</tr>
<tr>
<td>The company offers high package fringe benefits that can be converted to cash.</td>
<td>3.367144</td>
</tr>
<tr>
<td>The company provides profit sharing programs.</td>
<td>3.332966</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>3.598362</strong></td>
</tr>
</tbody>
</table>

There are seven specific Compensation practices that were rated as propellers of CE by the employees and management. The content analysis indicates that these practices are related to recognition of good performance not only in terms of salary but also in the form of incentives, premium pay, and fringe benefits. The top three practices based on the mean scores of the employees are: (1) the company properly acknowledges and adequately compensates overtime; (3) the company provides financial rewards other than salary; and (2) the company is likely to offer incentive or variable pay.

The overall mean rating on this bundle of SHRM practices by the employees is 3.60. The test about a population mean showed a $p$-value of $3.25 \times 10^{-10}$ which is significant at $\alpha = .005$. Thus, the null hypothesis that this SHRM function is moderately implemented ($x = 3.50$) is rejected. This indicates that employees perceived that the compensation practices are extensively implemented to promote CE. This simply confirms that companies belonging to the Top 1000 Corporation are financially capable of providing a compensation package that stimulates employees to become innovative, creative, and risk takers in the pursuit of their functions in the organization.
Table 4

**Performance Management**

<table>
<thead>
<tr>
<th>Performance Management Practices</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>The company recognizes results with enthusiasm.</td>
<td>3.818082</td>
</tr>
<tr>
<td>The managers provide constructive feedback on their performance.</td>
<td>3.744212</td>
</tr>
<tr>
<td>The company prefers continual coaching rather than over-reliance on formal performance evaluation.</td>
<td>3.633958</td>
</tr>
<tr>
<td>The company provides an opportunity for employees to evaluate their managers and their peers.</td>
<td>3.487872</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>3.671031</strong></td>
</tr>
</tbody>
</table>

There are four specific Performance Management practices that were rated as facilitators of CE by the employees and management. The content analysis reveals that the top Performance Management practice based on the mean scores of the employees is “the company recognizes results with enthusiasm” ($x = 3.81$).

The overall mean rating on this bundle of SHRM practices by the employees is 3.67. The test about a population mean indicated a p-value of .0000 which is significant at $\alpha = .05$. Thus, the null hypothesis that this SHRM function is moderately implemented ($x = 3.50$) is rejected. This indicates that employees perceived that the performance management practices are extensively implemented to promote CE. This result is also a confirmation that performance feedback is vital in ensuring that employees will develop an intrapreneurial mind and spirit in the company.

Table 5

**Employee Relations**

<table>
<thead>
<tr>
<th>Employee Relations Practices</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers communicate the company's business strategy.</td>
<td>3.933297</td>
</tr>
<tr>
<td>Managers’ beliefs are based on values, such as respect for their people, guides the company with what they do more than just running the company with simply strategies.</td>
<td>3.916207</td>
</tr>
<tr>
<td>The company is focused on team-oriented culture.</td>
<td>3.870452</td>
</tr>
<tr>
<td>The company has systems and practices in place that inspire the workforce to do their best.</td>
<td>3.854465</td>
</tr>
<tr>
<td>The company creates a feel-good atmosphere in the workplace.</td>
<td>3.807056</td>
</tr>
<tr>
<td>Managers utilize every communication channel possible to help employees understand the company's direction.</td>
<td>3.838479</td>
</tr>
<tr>
<td>Managers provide frequent and continuous communication, regarding their expectations on the employees</td>
<td>3.758545</td>
</tr>
<tr>
<td>The company creates fun atmosphere in the workplace.</td>
<td>3.713892</td>
</tr>
<tr>
<td>The company is giving more control over how, when, for whom and where the employees work.</td>
<td>3.679713</td>
</tr>
<tr>
<td>The company is transparent in decision-making.</td>
<td>3.640022</td>
</tr>
<tr>
<td>The company has a clear cut communication flow between managers and subordinates.</td>
<td>3.687982</td>
</tr>
<tr>
<td>Managers consult employees when major changes are made in the company.</td>
<td>3.656560</td>
</tr>
<tr>
<td>The company is open to criticism.</td>
<td>3.622933</td>
</tr>
<tr>
<td><strong>Overall Mean</strong></td>
<td><strong>3.767662</strong></td>
</tr>
</tbody>
</table>
There are 13 specific Employee Relations practices that were rated as enhancers of CE/innovation by the employees and management. The item analysis shows that these practices are related to communication, value placed on people, organizational climate, team-based orientation, and decision-making. The top three practices based on the mean scores of the employees are: (1) managers communicate the company's business strategy; (2) managers' beliefs are based on values, such as respect for their people, guides the company with what they do more than just running the company with simply strategies; and (3) the company is focused on team-oriented culture.

The overall mean rating on this bundle of SHRM practices by the employees is 3.77. The test about a population mean showed a $p$-value of .0000 which is significant at $\alpha = .005$. Thus, the null hypothesis that this SHRM function is moderately implemented ($x = 3.50$) is rejected. This indicates that employees perceived that the employee relations practices are extensively implemented to promote CE.

The finding shows that management recognizes the critical role of labor relations in enhancing CE effective communication, teamwork, trusting atmosphere, and participative style of decision making.

**Significant SHRM Practices as Enhancers of Corporate Entrepreneurship**

<table>
<thead>
<tr>
<th>SHRM Functions</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>$t$-Ratio</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Relations</td>
<td>1.128920</td>
<td>0.168534</td>
<td>6.698</td>
<td>2.11 x10^{-11} ***</td>
</tr>
<tr>
<td>Training and Development</td>
<td>0.505890</td>
<td>0.159501</td>
<td>3.172</td>
<td>0.0015 ***</td>
</tr>
<tr>
<td>Performance Management</td>
<td>0.341032</td>
<td>0.177673</td>
<td>1.919</td>
<td>0.0549</td>
</tr>
<tr>
<td>Compensation</td>
<td>0.077605</td>
<td>0.107865</td>
<td>0.7195</td>
<td>0.4719</td>
</tr>
<tr>
<td>Recruitment and Selection</td>
<td>1.073390</td>
<td>0.166108</td>
<td>6.462</td>
<td>1.03 x10^{-10} ***</td>
</tr>
</tbody>
</table>

* significant at $\alpha = .05$; ** significant at $\alpha = .01$; *** significant at $\alpha = .005$

A total of 1,814 valid responses were included in the regression analysis. The log likelihood of the model is -1611.056. This is used in the Likelihood Ratio (LR) Chi-Square test of whether all predictors’ regression coefficients in the model are simultaneously zero and in tests of nested models. The LR statistic obtained (with five degrees of freedom) is 1402.45. The $p$-value of this LR stat is very low, which leads to the conclusion that at least one of the predictors' regression coefficient is not equal to zero in the model. The Count-$R^2$ of the model is 62.2%.

In the logit parameter estimates, each of the five SHRM practices has a positive effect on the ordered log-odds of being in a higher response category while the other variables in the model are held constant. The variable with the highest ordered log-odds regression coefficient is Employee Relations (1.1289), followed by Recruitment and Selection (1.0734) and Training and Development (0.5059). Compensation, on the other hand, has the lowest ordered log-odds regression coefficient (0.0776). Using the $t$-statistic, the coefficients of Performance Management and Compensation are not significant, while the coefficients of Employee Relations, Training and Development, and Recruitment and Selection are significant at the 0.005 level of significance.

<table>
<thead>
<tr>
<th>SHRM Functions</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Relations</td>
<td>3.092315</td>
</tr>
<tr>
<td>Recruitment and Selection</td>
<td>2.925279</td>
</tr>
<tr>
<td>Training and Development</td>
<td>1.658461</td>
</tr>
</tbody>
</table>

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Among the three variables with significant coefficients, the one with the highest proportional odds ratio is Employee Relations. It means that it is the most significant enhancer of CE in the surveyed companies. The variables Training and Development and Recruitment and Selection have less influence compared to Employee Relations, but significant nonetheless. This result reveals that it is not money that will significantly motivate employees to acquire a CE orientation but it is the people-focused culture that management is implementing through effective Labor Relations practices.

Conclusion and Recommendation

Leading companies in the Philippines have realized that nurturing an entrepreneurial culture through the implementation of various SHRM practices will enhance their ability to gain competitive advantage and achieve a superior performance. This means having a culture where employees are encouraged to innovate, be proactive, cooperate with one another, and take risk, as well as establishing a set of policies and procedures that formally supports entrepreneurial behavior.

Recognizing the vital role of SHRM in the advancement of CE, the companies have adopted different practices related to SHRM functions. Employees perceived that various practices in each of the SHRM functions, except in the area of Compensation, are extensively implemented to stimulate innovation in their organization.

Moreover, there is a significant difference between the response of the employees and the response of the management representatives on the degree of implementation of the various functions of SHRM as enablers of CE. It is only in the Performance Management practices where there is no significant difference was found.

SHRM practices related to the functions of Employee Relations, Training and Development, and Recruitment and Selection are found to be significant enablers of CE. However, Employee Relations proved to be the most significant enhancer of innovation in the surveyed large companies in the Philippines. This shows that these firms have the ability to support growth, empowerment, and advancement of their most valued asset, their people.

It is therefore recommended that the firms continue or even strengthen the advancement of CE in their respective organization, must mandate their SHRM unit to give more focus on strategic priorities related to Employee Relations such as team-based orientation, open and regular communication through various channels, positive organizational climate, respecting and treating people fairly, empowerment, and flexibility.

In regard to Training and Development, the companies’ primary intervention should be to encourage, support, nurture, and train to improve the competencies of their managers, supervisors, and rank-and-file employees to foster the entrepreneurial mindset and culture. This necessitates continuing significant investment in their human capital’s growth and advancement.

Extra attention should also be afforded to the strategic activities related to the function of Recruitment and Selection. The important objective is to be able to attract potential employees and choose the right people who possess not only the technical skills but the behavior and values aligned with the beliefs and culture of the organization. Adopt evolving practices such as having a rigorous process using a multiple hurdle approach to screen applicants, use a less rigid job description, hire people with diverse skills, and develop customized selection tests that measure the entrepreneurial aptitude of job applicants.

Finally, there is a need to conduct further in-depth research that will investigate strategic SHRM practices that have high and significant influence in stimulating CE not only in the Philippines but in other transitional economies as well.
References


Changing the Entrepreneurial Mindset of the Youth

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Abstract

Although each of Germany’s 16 states sets its own education requirements, nearly at all schools they teach through the lens of workplace conflict between employer and employee, the central battle being over wages and work rules. Surveys show that if there’s one unifying characteristic of German school textbooks, it’s the tremendous emphasis on group interests, the traditional social-democratic division of the universe into capital and labour, employer and employee, boss and worker (Europe’s Philosophy of Failure, 2008). If it is to achieve a greater success of the European Union’s strategy Europe 2020, the former Lisbon strategy, that means focusing the efforts on two principal tasks – delivering stronger, lasting growth and providing more and better jobs for growth and employment, Europe needs to stimulate more favorable societal climate for the entrepreneurial mindsets of young people, encourage innovative business start-ups, and foster a culture that is friendlier to entrepreneurship and to the growth of small and medium-sized enterprises (SMEs). So the European Parliament and the Council set out the eight key competencies for Life Long Learning among them “Entrepreneurship” as an individual’s ability to turn ideas into action (Commission of the European Communities [COM], 2005).

Keywords: Entrepreneurship education, entrepreneurial university
Background

Entrepreneurial Climate in Europe

The financial crisis is a wake-up call for Europe, the moment where we recognize that "business as usual" would consign us to a gradual decline, to the second rank of the new global order. This is Europe's moment of truth. It is the time to be bold and ambitious (Flash Eurobarometer, 2009). One of the main challenges facing EU Member States in order to overcome the crisis is the need to boost entrepreneurship. But unfortunately a current survey by the European Commission’s Directorate-General “Enterprise and Industry” shows the opposite development. The survey “Flash Eurobarometer No283 Entrepreneurship in the EU and beyond” – covers topics such as the development of entrepreneurship, how entrepreneurial mindsets are being fuelled and what encourages people to become entrepreneurs. It provides also data about public attitudes on issues such as entrepreneurship, entrepreneurial education, risk-taking, start-ups, obstacles to entrepreneurship and business failures. For comparison the survey delivers also appropriate data from Asian countries as well as from US.

From former surveys we know already that the Europeans are not as entrepreneurial as they have to be in order to reach the objectives of the former Lisbon strategy that is now the Strategy Europe 2020. We also know that the development in science and technology in the Asian countries is rapidly growing. Actually these facts should be seen already as a signal for acting. But the crisis not only destroyed two million of working places in Europe; it changed the entrepreneurial spirit and behavior of the people still more in the negative direction.

As a precondition for further accomplishments we just want to pick out three topics within this paper that are relevant for discussing about entrepreneurial mindset: (1) The society’s image of the entrepreneurs; (2) The key driving factors of becoming an entrepreneur; and (3) The impact of education.

Discussion

The Society’s Image of the Entrepreneurs

When we look at the image of entrepreneurs (both, positive or negative) in the countries in the EU, we have to realize that more and more people distrust the entrepreneurs.

For Germany it can be pointed out that the society’s image of the entrepreneur is still above the EU average. Nevertheless, we got the feeling that there still has to be done more for the entrepreneurial mood within Germany.

In general most people were likely to agree that entrepreneurs were job creators. A comparison of 2007 and 2009 results showed that respondents in almost all countries in EU were now more likely to agree that entrepreneurs only thought about their wallet or that they exploited other people’s work. Thirty eight (38%) of the Germans agreed in 2007 with this argument. In 2009 the number increased up to 47 %. Even in the US the negative development has been observed. In 2007, 74% of the US citizens disagree with this argument. In 2009 this number decreased to 67 %. The main reason for this mood is the financial and economic crisis (Flash Eurobarometer, 2009).
EU is also characterized by the increases in negative perceptions when looking at the second negative statement “entrepreneurs exploited other people’s work”. In 2007, 42% of the EU citizens agreed that entrepreneurs exploited other people’s work; in the current wave, however, almost the half agreed that this was the case. But young EU citizens and those with a higher level of education were more likely than their counterparts to disagree with both negative statements about entrepreneurs. For example, about half of full-time students and respondents with the highest level of education disagreed that entrepreneurs only thought about their own wallet (48% and 51%, respectively); this proportion decreased to 32% for the least educated respondents. (Flash Eurobarometer, 2009, p. 30). Here the great potential can be seen in higher education in order to foster the entrepreneurial mindset within the society.

Currently, a total of 12% of EU citizens were involved in entrepreneurial activity. Outside the EU, the level of entrepreneurial activity was the highest in China (27%), followed by Turkey (23%), then the US (21%). Even after years of efforts to foster entrepreneurship it has been observed that there is no improvement. EU citizens were almost evenly divided in their preference for being self-employed or having employee status: 45% would prefer the former and 49% the latter. In the US, a majority of respondents would opt for self-employment, while just over a third would prefer to be employees(55% vs. 36%). In Germany only 41 % of the respondents want to become entrepreneurs and 56% want to be employees.1 (Flash Eurobarometer, 2009, p. 13) For this reason many representatives point out that the Lisbon Strategy failed in its goals.

The Key Driving Factors of Becoming an Entrepreneur

Nevertheless, the entrepreneurial power within the EU is strong. EU citizens who preferred to be employees were most likely to give reasons related to the security of employee status to explain their choice for this type of employment. Four in 10 respondents referred to a “regular and fixed income” and 35% mentioned “stability of employment”. Other factors mentioned were “fixed working hours” (16% of EU citizens mentioned this) and “protection by social security and insurances” (13%). A regular, fixed income (vs. an irregular, variable income) was mentioned least often by respondents in China (11%), Iceland and the US (both 14%) (Flash Eurobarometer, 2009, p. 12).

A large majority of EU citizens who expressed a preference for self-employment made this choice because of the freedom provided, such as personal independence, self-fulfillment and the chance to do something of personal interest (mentioned by 68%). However, only 5% of EU citizens would prefer to be self-employed because this would offer better income prospects.
Some EU citizens had more opportunistic reasons for preferring to be self-employed: 9% said it would enable them to realize a business opportunity, 3% said it was due to the favorable economic climate and 2% wanted to contribute to society. Respondents in Germany were the least likely to name this particular advantage of being self-employed (21%).

Key factors: As in previous years, EU citizens, in almost all countries, who had once started up a business or who were thinking about taking the necessary steps to start one, were most likely to answer that an appropriate business idea (85%) and receiving the necessary financial means (81%) had motivated them to start up a business.

In the EU, among respondents who had started up a business or were currently taking steps to start one, 55% answered that they had started/were starting this business because they saw an opportunity and 28% did so out of necessity. The US scored higher than the EU average in terms of the proportion of respondents identifying opportunity-driven entrepreneurship with 62% vs. 55%.

**Impact of Education**

Equal proportions of EU citizens agreed, or rather disagreed, that their school education had helped them to develop a sense of initiative, or in other words, a sort of entrepreneurial attitude. Roughly 4 in 10 agreed that their school education gave them the skills and know-how to enable them to become entrepreneurs (10% “strongly agreed” and 29% “agreed”); just a quarter agreed, however, that their education had also made them interested in becoming entrepreneurs (6% “strongly agreed” and 19% “agreed”).

Finally, 11% of EU citizens strongly agreed and 33% agreed that their school education had helped them to understand better the role of entrepreneurs in society. Nevertheless, none of the EU countries reached the levels measured in China, Turkey and the US where more than two-thirds of respondents agreed that their school education helped them to develop an entrepreneurial attitude (68%-73%).

In Germany more than half (52%) strongly agreed that school education supported to develop a sort of entrepreneurial attitude. Also half of the German respondents agreed with the argument that school education helped them to understand better the role of entrepreneurs in society. The EU average is only 44%. In comparison, 75% of Chinese respondents strongly agreed with this perspective. But when the question was asked whether school education made them interested to become entrepreneurs all countries, even outside of Europe, were likely to say that school education failed in this subject. Furthermore, in most countries, respondents who strongly disagreed outnumbered those who strongly agreed; respondents in France and Hungary were the most likely to express strong disagreement (both 40%) (Flash Eurobarometer, 2009, p. 97).
Figure 2. Percentage of respondents who agreed that their school education made them interested to become entrepreneurs.

![Bar chart showing percentages of respondents interested in becoming entrepreneurs by region.](image1)

Figure 3. Percentage of respondents who agreed that their school education gave them skills and know-how to run a business.

![Bar chart showing percentages of respondents with business skills by region.](image2)
Lisbon Strategy and its developments into Europe 2020

Looking back to the first efforts to establish a Lisbon Treaty we found the start in December 2001 when the EU commits to become more democratic, transparent and effective. In 2002 the convention of the future of Europe started to work. In 2004 European leaders reached an agreement on the Draft Constitution and the ratification process began. Unfortunately, Netherland and France voted “NO” in 2005 and a new treaty had to be made. Again in 2008 a No vote from the Irish brought the ratification process into trouble. After more efforts the final treaty was enforced on 1 December 2009. The long and difficult process demonstrated the different points of view of the 27 EU Member States.

One outcome of this learning process was the development of a strategy to help us come out stronger from the crisis and turn the EU into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion. The Europe 2020 was developed to set out a vision of Europe's social market economy for the 21st century. In parallel the European Council contracted a group of experts to submit a report on the challenges that are likely to face the EU in 2030 and how we might address them. But firstly, we want to take a look at the strategy of Europe 2020 and its main aims and instruments.

The EU needs to define where it wants to be by 2020. Europe 2020 puts forward three mutually reinforcing priorities: (1) Smart growth: developing an economy based on knowledge and innovation; (2) Sustainable growth: promoting a more resource efficient, greener and more competitive economy; and (3) Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

The first priority is the main important point for our perspective. To this end, the Commission proposes the following EU headline target: Beside climate/energy targets and employment rates one main target is that at least 40% of the younger generation should have a tertiary degree (Europe 2020, p. 3).

With different flagship initiatives the Commission wants to put forward the progress of the priority themes. There is "An agenda for new skills and jobs "to modernize labour markets and empower people by developing their skills throughout their lifecycle with a view to increase labour participation and better match labour supply and demand, including labour mobility.

Smart growth means strengthening knowledge and innovation as drivers of our future growth. This requires improving the quality of our education, strengthening our research performance, promoting innovation and knowledge transfer throughout the Union. But, to succeed, this must be combined with entrepreneurship and a focus on user needs and market opportunities. (Europe 2020, page 9)

Within this process the task of the European Commission is to promote knowledge partnerships and strengthen links between education, business, research and innovation and to promote entrepreneurship by supporting Young Innovative Companies. At the national level, Member States will need to ensure a sufficient supply of science, math and engineering graduates and to focus school curricula on creativity, innovation, and entrepreneurship. (Europe 2020, page 11)

Another important issue, is the inclusive growth which means empowering people through high levels of employment, investing in skills and modernizing labour markets. By 2020, 16 million more jobs will require high qualifications, while the demand for low skills will drop by 12 million jobs. Achieving longer working lives will also require the possibility to acquire and develop new skills throughout the lifetime. The task for the European Commission is to ensure that the competencies required in engaging in further learning and the labour market are acquired and recognized throughout general, vocational, higher and adult education and to develop a common language and operational tool for education/training and work: a European Skills, Competencies and Occupations (ESCO) framework. At the national level, Member States will need to ensure that the competencies required to engage in further learning and the labour market are acquired and recognized throughout general, vocational, higher and adult education, including non formal and informal learning (Europe 2020, p. 16).

The aim of the strategy 2020 is that by the end of 2010 all member states should have entered Stability and Convergence Programmes and National Reform Programmes. An annual report by the
countries will give recommendations for the implementation of reforms. This process should be continued until 2020 (Europe 2020, p. 32).

As mentioned before, the European Council contracted a group of experts to deliver a report on the challenges that are likely to face the EU in 2030 and how we might address them. The EU’s human capital has long underpinned its economy, based on cutting-edge innovation and creativity. But other regions are now moving ahead through higher levels of investment in research, technological development and innovation. By 2030 Asia is expected to be at the forefront of scientific and technological developments, producing high-value goods capable of transforming production and overall quality of life. Yet against the background of new domestic and global pressures, the previous economic and social model, referred to as a ‘highly competitive Social Market Economy’ in the Lisbon Treaty, needs to be re-defined and adapted to a changing context (Project Europe 2020, p 11).

Economic growth is increasingly based on technological change and enhanced specialization in the context of deepening globalization. Unnecessary burdens on labour and companies must not stifle the growth of dynamic and innovative service production while entrepreneurship and risk taking should be encouraged. Reforming the labour market is central to creating more and better jobs. Member States should aim at improving three key aspects of their labour markets: the flexibility and security of their workforce (“flexicurity”); labour mobility; and the entrepreneurial culture. In a fast-changing world it is not jobs that need to be protected, but rather the person who loses a job by enhancing his or her employability. Central to this approach is the capacity to acquire and adopt skills over the course of a lifetime, combined with the conditions for transporting skills between and within Member States (Project Europe 2030, p. 11). Growth through knowledge, the special competitive advantage, becomes more and more important. Knowledge-based and creative industries and services have expanded significantly over the last two decades, becoming the central pillars for employment and economic dynamism in Europe. Today, intelligence, innovation and creativity have become the relevant benchmarks. The EU cannot afford to be complacent when confronted with this trend. If the EU is to realize the promise of the knowledge society it must create a social, economic and regulatory environment in which research, creativity and innovation can flourish. That includes the development of flexible and open curricula capable of nurturing curiosity and creativity among children; and strengthening links between public education systems, business and society. Furthermore, the administrative and financial autonomy of universities must also be encouraged, as this is the most effective way to increase private funding for higher education. As future beneficiaries, high income students should contribute to the mounting cost of education while a system of scholarships and student loans should be made available to students who need financial support.

Competition between universities must also be promoted, as should governance models based on accountability and transparency. The focus must shift to ensuring that universities have greater exposure to the real economy in Europe and the rest of the world. Indeed, correcting the mismatch between the supply and demand for expertise must become one of the top priorities of the educational system. This will require a strong emphasis on skills upgrading in order to prepare individuals for employment transitions as well as the use of new technologies and skills. Today, SMEs account for half of the EU's GDP although they benefit from only 15 per cent of R&D programmes. New forms of partnership are needed between researchers at publicly-financed universities and researchers at privately-financed companies to ensure a continuous pooling of knowledge throughout the process of research and innovation. Europe often finds it difficult to translate scientific research into new products, new patents, new entrepreneurial activities and new jobs. A lack of competition in service markets inhibits innovation, raises costs and limits growth (Project Europe 2030, p. 20).

The creative economy will continue to evolve faster than the political processes intended to support or regulate it. Facilitating a culture of risk-taking and entrepreneurship is even more important. Only this will allow the EU to fully reap the rewards of research and experimentation, and with it to create new jobs.
Germany’s contribution to an Entrepreneurial Society

We can’t make people entrepreneurs, if they don’t have the basic drive, energy, and a strong sense of what it takes to run a business. But if you have someone who has those basic skills, you should make him a much better entrepreneur. And this is also a task of a university because most entrepreneurs come from here. But what is the case in Germany? Entrepreneurship is part economic and part cultural. One of the most striking forces against entrepreneurship in Germany is its culture. Within the “National Global Entrepreneurship Monitor” 59.4 % of experts named the missing entrepreneurial culture as the most important obstacle (National Global Entrepreneurship Monitor [GEM], 2009, p. 21).

Germany is a society that is grounded in rules, process and order. While this has helped create some very successful large corporations, it has not fueled an entrepreneurial engine to their economy. As the global economy comes out of the recession, this will put Germany at a distinct disadvantage.

One reason for Germany’s low entrepreneurship rate is because of the lack of ambition of Germany students. 25% to 30% of young scientists have good chances for creating a business, but only 5% will take this step. One reason can be that the educational support by the politic sector cannot be the only way.

Germany belongs to the innovation driven economies. The German innovation system is specialized on incremental change and system innovations. The OECD pointed out within its Oslo Manual from 2005 that not only product and process innovation do belong to innovation. Also innovative marketing and organization methods can be an innovation. E.g. an innovation company introduces several new elements within an existing work flow and creates with it big benefit (Ten Year EXIST, 2010, p. 31)

Within the universities and research centers we still need a healthy mix between researchers who are interested in basic research on the one hand and entrepreneurial motivated „scientific researchers“ on the other hand. In addition we need entrepreneurial thinking people within this structure who are able to identify the business idea and to realize it. That can be professors, post docs or graduates (Ten Year EXIST, 2010, p. 32).

That’s why the entrepreneurial preparation of these different target groups becomes more and more important. Unfortunately, the situation of entrepreneurial education in Germany is not sufficient (National GEM, p. 26). Germany belongs to the group of innovation driven countries. The following countries belong also to this group: Belgium, Denmark, Finland, France, Greece, Hong Kong, Iceland, Israel, Italy, Japan, Republic of Korea, Netherlands, Norway, Slovenia, Spain, Switzerland, United Arab Emirates, United Kingdom, and United States. In comparison to the average of the 18 other innovation driven countries Germany was ranked on the last place 18 concerning the entrepreneurial knowledge and on place 13 concerning the entrepreneurship education. Germany also has a historically high tax rate, which has also stifled entrepreneurial activity. The data about German entrepreneurship speaks volumes (GEM 2009, p. 34). In the 2009 Global Entrepreneurship Monitor Germany had one of the lowest entrepreneurship rates in the study (GEM 2009, p. 21). When looking at the motivation for entrepreneurial activity of the innovation-driven economies, Germany has the next to the last highest rate of entrepreneurs who start businesses out of necessity rather than proactively pursuing opportunities identified in the economy. Only the Republic of Korea is more miserable.

Taking all these arguments into account Germany has to change its strategy of fostering entrepreneurship within the society and within the educational stream. In 2009 the structure of the government changed after the election. The new coalition underpins entrepreneurship education and the entrepreneurial climate in its coalition contract. Germany should become an entrepreneurial country. That’s why new campaigns and programs came to life to support this strategic goal. Beside several local activities there are two main streams that we want to describe within this paper. With the start of the new coalition the government launched the so called “Start-up-Week”. For one week, young people from 14 up to 30 years around Germany join a growing movement of entrepreneurial people, to generate new ideas and to seek better ways of doing things. Together with all 16 Bundesländer this initiative wants to
inspire young people to embrace innovation, imagination and creativity: to think big; to turn their ideas into reality; to make their mark. The original idea came from the Global Entrepreneurship Week that was organized 2008 and 2009 by Wismar University and a partner in South Germany. In 2010 the government took over the leading role and established the national campaign “Start-up-Week” as the contribution to the international campaign “Global Entrepreneurship Week” (www.unleashingideas.org). One week in November the Global Entrepreneurship Week connects young people everywhere through local, national and global activities designed to help them explore their potential as self-starters and innovators. Students, educators, entrepreneurs, business leaders, employees, non-profit leaders, government officials and many others participated in a range of activities, from online to face-to-face, and from large-scale competitions and events to intimate networking gatherings. Through this initiative, the next generation of entrepreneurs is inspired and can emerge. In doing so, they will begin to acquire the knowledge, skills and networks needed to grow innovative, sustainable enterprises that have a positive impact on their lives, their families and communities.

The second big initiative that has been fostered and financed by the national government is the EXIST-programme (www.exist.de). EXIST is a support programme of the Federal Ministry of Economics and Technology (BMWi) aimed at improving the entrepreneurial environment at universities and research institutions and at increasing the number of technology and knowledge based business start-ups. The EXIST program promotes projects at universities and non-university research institutions aimed at providing skills and support for technology and knowledge-based company start-ups. In support of these activities, universities and research institutions receive a non-repayable grant over a three-year period. The projects may include measures geared towards the following activities: (1) to establish a lasting “culture of entrepreneurship” at universities and research institutions; (2) to support consistent transfer of scientific knowledge into commercial output; (3) to promote the enormous potential of business ideas and entrepreneurial personalities at universities and research institutions in a targeted manner; and (4) to increase the number and the chances of success of innovative business start-ups.

Started in 1998 with an entrepreneurial national competition it is now the biggest program for supporting entrepreneurship on the tertiary level. Within three periods of support altogether 46 so called entrepreneurial regions were established within the program. After twelve years running of the program almost every university is involved in any activity that is coming out from this program (Ten Years EXIST, p. 19).

As we can see through the mentioned examples, Germany’s policy puts a lot of efforts and money for bringing Germany to the forefront of entrepreneurship. But maybe it is not the right way. While all the efforts and money invested, still the entrepreneur has been seen as the “bad man” in the society and almost the half of the Germans are afraid to fail if they start up a business. These are definitely the weaknesses of Germany. The completely opposite country is the USA. Their strengths are the weaknesses of Germany. The high readiness to take risk and the positive entrepreneurial climate within the society are central key stones for high entrepreneurial rates. In comparison, the support given by policy and public support programs in Germany is rather weak. That’s why Germany should invest firstly in changing the mindset before investing in start-ups (National GEM, p. 27).

Entrepreneurship Education at Wismar University

Many are still questioning whether entrepreneurship is worth the investment, whether entrepreneurship training enhances their students’ abilities to compete in today’s job market, and whether their entrepreneurship students make stronger and more successful business leaders. Wismar University is a University of Applied Sciences in Technology, Business and Design. A core aspect of the university’s mission is to encourage enterprising behaviours, attitudes and activities. The mission of Wismar University can be determined in the three words “entrepreneurial, competitive and future oriented”.

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Within this mission the project “Entrepreneurial University” is one core element. That means for the entrepreneurship education on campus students will gain skills such as:

- The “opportunity recognition” skill
- Self-confidence
- Strategic thinking
- Cooperate for success
- Ability to plan work, organize tasks and communicate decisions
- Project development and implementation
- Team-building and attribution of success
- Recognition and proactive orientation to change and innovation
- Risk assessment and foresight activity with regard to market changes and opportunities
- To be, by temperament, unsatisfied with the status quo and always searching for possibilities beyond it
- Thinking differently and expansively, across boundaries
- To be action-oriented but research-driven
- To build a wide range of interdisciplinary skills that give them maximum flexibility and preparation for the future.

To be effective, such a strategy needs to be endorsed by the university’s governing body, incorporated into the strategy for the university, and, importantly communicated to the staff. However, words are not sufficient. Senior management need to model the behaviour they wish to promote. That’s why all measures for promoting entrepreneurship within the university are the strategic task of the rector. That includes measures to sensitize, educate and coach students to become more entrepreneurial.

Main streams of education should be based on entrepreneurial approaches. One precondition is that almost all professors of Wismar University have gained already business experiences before entering into the university. In addition, many professors have next to their teaching job a company or a leading position in a company or institute. This implicates that academic staff should be able to teach in an entrepreneurial way, deploying pedagogy that challenges themselves as well as students. It also implicates that the students' learning experience is infused with uncertainty and ambiguity, and that they are encouraged and enabled to cope with, address and resolve these challenges to personal certainty.

In general implementing entrepreneurship means for most universities to establish an entrepreneurship chair. Very popular is also to offer entrepreneurship courses or study programs. Responsible persons for these courses mostly are staff members in business faculties or business schools of these universities. If we look at the ranking of universities concerning their entrepreneurial activities, such indicators are likely listed as an evidence of entrepreneurial behaviour. While special courses only attract students who are already interested in this subject or who have already an idea, the concept of Wismar University is much broader. Wismar University goes a completely the other way, because it wants to attract all students. Of course Wismar University offers also such kind of course to the students but that is the second step. With these specialized offers we just reach 10% of the students, and this is already a good result in comparison to the average in Germany.

Wismar University wants to integrate entrepreneurship education progressively into the curricula. The design of effective entrepreneurship skills provision needs to build on a good understanding of the skills required. First step, was a commonly understood framework to identify the set of skills necessary to act entrepreneurial. That’s why a range of specific skills needed to be identified firstly. A working group consisting of professors from all faculties and representatives of the university management and the centre of entrepreneurship worked out a common definition of entrepreneurship skills. The natural question then was to understand whether existing entrepreneurship training is sufficiently widespread, appropriately designed and appropriately delivered. For some time now we have been exploring how
entrepreneurship should be taught. The main target was to create a structure for each study program that integrates all important entrepreneurial skills that are necessary. We analyzed all modules and handbooks concerning entrepreneurial skills that are mentioned as learning outcomes. This is a still ongoing process.

Next step is to identify the learning methods. Classroom lectures delivered by academic teachers are not necessarily the best way to supply entrepreneurship training. More interactive, reality-based and experiential approaches are probably better suited for supporting entrepreneurial behaviors. Examples which include virtual and real business creations, business plan competitions, interaction with real entrepreneurs and role models are also of much benefit to prospective entrepreneurs. It is possible to teach e.g. time management or problem solving skills in a math lesson. Also, it is possible to integrate teamwork and creativity in ship mechanics. Conversations with the professors need to be launched to convince them to use more active teaching methods. The information provision, analysis and recommendations that will be delivered by this approach are intended to secure better entrepreneurship training in our university.

Conclusion

Entrepreneurship is a key driver of economic growth and job creation. It provides many people with career opportunities that better fit their preferences than waged employment. However, many inputs are required for successful entrepreneurship. One of the most important is entrepreneurship skills. Motivated people need the right skills to identify entrepreneurial opportunities and to turn their entrepreneurial projects into successful ventures, skills such as business planning, risk assessment, team building and negotiation. The importance of skills for being successful in entrepreneurship is generally under-recognized in the tertiary education. The European study that was explained at the beginning of the paper determined the fact that Europe and in particular Germany are not yet ready for globalization. The necessary entrepreneurial climate is still missing. The paper gave a short overview of the status quo in Europe and Germany and a possible new way out of the dead-end street. Wismar University has been developing a good practice on practicing entrepreneurship education within all study programs.

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Leadership Education at Wismar University - Core Competence for Intrapreneurs and Entrepreneurs in a Knowledge Society

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Abstract

Entrepreneurship has to become a mainstream at the Wismar University. In January 2009 the Wismar University established one centre – Centre for Entrepreneurship (CfE) - as the coordinator of all entrepreneurial activities at the University. The CfE is a central unit of the University management. Under the roof of the “Entrepreneurial Wismar University” the CfE works hand in hand with the Career Service of Wismar University. In cooperation with the Career Service, the CfE started a Leadership-Training for the students of Wismar University as a new educational offer in October 2009. The training consists 6 sessions, is accepted by students. Participation is limited to 15 students to guarantee high quality education. For this educational offer, we co-operate with experienced trainers and lecturers, who have lots of practical expertise, even as entrepreneurs. This guarantees a realistic, application-related and practically oriented supply. After the training, students will be more experienced in leadership and taking over responsibility in a company as an intrapreneur (employee with entrepreneurial competencies) or as an entrepreneur for their future employees.

Keywords: Leadership education, entrepreneurship, higher education, competencies of graduates
Background

Education for students is the duty of Universities. Therefore they are in charge to mediate specialized knowledge as well as competence for entrepreneurs (Moog, 2005).

Today, we find ourselves in a phase of social development, where knowledge significantly is treated as a central source. Formal and retrievable knowledge is not a demand anymore but more on empirical, discernment and self-organization. The component of behavior and the motivation are considered in a knowledge society. Such factors are known as human capital (Stehr, 1994).

In 2005, the Commission of the European Communities sophisticated eight different key competences at a knowledge society. “Key competences are those which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment. By the end of initial education and training young people should have developed the key competences to a level that equips them for adult life, and they should be further developed, maintained and updated as part of lifelong learning” (Commission of the European Communities, 2005, p.13).

There are many themes like critical thinking, creativity, initiative taking, problem solving, risk assessment, decision making and feelings management which take part in all eight competences (Commission of the European Communities, 2005). The society and economy in countries with less raw materials have to rely on knowledge. With globalization, it is more important than ever to prevail over competitors and to position themselves.

Key Competencies

A lot of the following competences interlock and overlap: (1) Communication in the mother tongue; (2) Communication in foreign languages; (3) Mathematical competence; (4) Digital competence; (5) Learning to learn; (6) Interpersonal, intercultural, social competence and civic competence; (7) Entrepreneurship; and (8) Cultural expression.

Discussion

Entrepreneurship Education at Wismar University

“Entrepreneurship refers to an individual’s ability to turn ideas into action. It includes creativity, innovation and risk taking, as well as the ability to plan and manage projects in order to achieve objectives. This supports everyone in day to day life at home and in society, employees in being aware of the context of their work and being able to seize opportunities, and is a foundation for more specific skills and knowledge needed by entrepreneurs establishing social or commercial activity” (Commission of the European Communities, 2005, p.18).

The Wismar University always had a special interest in entrepreneurship education as one of the key competences. For this reason we started to establish an entrepreneurial spirit more than 10 years ago. In January 2009, the Wismar University established one centre – Centre for Entrepreneurship (CfE) - as the coordinator of all entrepreneurial activities at the University. The CfE is a central unit of the University management and works closely together with the Career Services of the University, as well as the Educational Institute of Economy (BdW gGmbH), a partner of the university for many years.

For example the CfE organizes two extra curricular which taught seminars for entrepreneurship education across the campus. In addition, we offer personal and individual training, workshops, round of talks and theme-evenings. These all contains entrepreneur and intrapreneur (employee with entrepreneurial competencies) subjects and recently, a Leadership-Training, jointly with the Career Service of Wismar University. All offers are free of charge and directed to students from all faculties.
Leadership-Training at Wismar University

Entrepreneurial thinking and acting are essential for all academic educated persons, for future entrepreneurs and intrapreneurs, as well as future leaders and employees with or without management responsibilities. During their studies in “normal curricula”, students receive complex knowledge as well as soft skills and learn how to implement knowledge in practice. Beyond that students need extra competences to take over a leader position (for example: social competence and conflict management). The Wismar University the Centre for Entrepreneurship' sensitizes students for these necessary skills and qualifies them. In cooperation with the Career Services of Wismar University, the CfE developed and drafted a Leadership-Training for students. The reason to draft a curricular for a Leadership-Training was the huge demand of our students and the need of the regional economy for young, well-educated and high potential leaders. The global aim is to educate good entrepreneurs and intrapreneurs in Mecklenburg-Western Pomerania.

Leadership is a term which can be differently defined. For us, it means a purposeful influencing control of humans in favor of reaching goals. A leadership in an enterprise has to focus the strategic goals as well as financing and controlling. In addition, a leader has to have an eye on his stuff, who must be informed about important process cycles and business decisions. A leader’s personality regards the enterprise as a whole and has many different responsibilities. (e.g. influencing control, motivation, cost optimization, appreciation, co-operation and communication as it is written in the key competences.) Participants get to know and learn how to transfer a successful project management and motivate employees as a leadership. It requires practice to deal with conflict situations successfully. Through this additional voluntary offer, students will be introduced to leadership and entrepreneurial skills early. Because of the dramatic demographic changes in Mecklenburg-Western Pomerania, we have to activate all available labor force. Therefore, enterprises will intensify their recruitment of women as managers and leaders very soon. Consequently, the gender aspect is been significantly considered in the Leadership-Training. Different skills and strengths of men and women will be shown and encouraged in the training.

The Training offers a possibility to get an insight in a comprehensive process of an enterprise. The participants are confronted with issues of project management, motivation of employee and communication. Similarly, issues such as conflict management and stress management are highlighted. The seminar is set up as a series of workshop and has given students opportunities to assess themselves, to train competences and to develop an idea of what it means to take responsibility for themselves and others. The training is based on “get to know from experiences”.

The Leadership-Training consist of six modules, between five to eight contact hours. Friday evening and Saturday are the best days to carry out and give all students the chance to participate without missing compulsory study courses. To guarantee a high quality and effective benefit, the number of participants is limited to 15 students. The Centre for Entrepreneurship and the Career Services has two trainers in every workshop whose going to educate and train the students. So far, we use psychologists and educators who allowed participants to share their experience from practice and illustrated contents with practical examples.

Module 1.

Students are dealing with group dynamic processes in the first module. We work on questions like: Who receives the specific role in a team? What kind of strengths and weakness does everybody have in the team? Students learn about themselves the kind of personality and skills they have and what they need to take over a leadership position. They get an impression whether they are a team player and in which team do they fit in. At the end of the training students should have recognized, that it is important to have different competences in a team to reach best results.
Module 2.

Participants play a business simulation game. They act as entrepreneurs and make team-decisions in a protected area. That means that students directly see that the decision they take which affects their enterprise either in a good or bad way. But the experiences they make do not have any real consequences. Depending on their strengths and their course of studies, participants are divided into four different teams. Every team simulates an enterprise for this day and competes with the other teams. They have to cooperate in their teams and use all different competences they have. They will already see the effects on the same day. Participants test their entrepreneurial qualities on that day and get a first individual feedback.

Module 3.

In this module participants learn the basics about different style of leadership. They try to find an appropriate style to communicate and to lead other people. They also get to know that different styles of leadership produce different reactions.

Module 4.

Every enterprise needs motivated employees. This requires self-confidence and communication management process. In this module, participants learn more than basics of motivation, communication and interview techniques. Students simulate serious conversations between employees and leaders. Therefore participants see what helps to motivate and what kind of techniques fits themselves. Personal development and extension of individual competences are also priorities in this module.

Module 5.

In this module, students learn how they can help to resolve conflicts, especially if they are in a leadership position. Mediation provides conflicts as an opportunity for change. Often, the dynamics of a clarifying conversation changes, if it is moderated and structured by a neutral third party. In mediation, conflict parties have the opportunity to find out what should and could be different.

Module 6.

In conclusion, the participants are engaged with the topic conflict and stress management. Conflicts, misunderstandings and inaccurate or lack of communication waste much power every day. The results are frustration and suboptimal working results. In this module, participants find ways to pay more attention to themselves, express themselves more clearly, deal with conflicts in a constructive way and protect themselves.

Composition of Participants at Leadership-Training

The Wismar University is doing statistics to improve all offers to uncover problems, find solutions and reach best result. Regularly, there are interviews of students to get suggestion for improvement. We are interested in their needs and wishes as well. Our aim is to reach 100% of students at the Wismar University with different entrepreneurship activities (including intra-curricular enhancement).

The figure shows that in 2009 the Leadership-Training exclusively reached students from the technology and business faculty. As a success we see an upward tendency at the participation from design sector compared to the previous years. The motivation of design students to attend at the Leadership-
Training is less than in other faculties, because they see themselves less in leading positions other than freelancer and creative loner.

*Figure 1. Participants by faculties in 2009*

![Pie chart showing participants by faculties in 2009: Technology 53%, Business 47%, Design 0%]

*Figure 2. Participants by faculties in 2010*

![Pie chart showing participants by faculties in 2010: Technology 60%, Business 27%, Design 13%]

In 2009, most of participants were under the age of 26. In 2010, the ratio was more balanced. The Leadership- Training contents are demanding and requiring reflection readiness. For this reason, the participation from the third Semester is recommended. The experience of the last two Leadership- Trainings shows that students are most interested in participation, before they graduate and deal with the idea to take a leadership position. At this time, they realize that leading requires many competences. They use the opportunity to train and gain competences they will need.
Because of the demographic changes, enterprises will intensify their recruitment of women as managers and leaders very soon. Therefore, the gender aspect is been significantly considered in the Leadership-Training. Different skills and strengths of men and women are shown and encouraged in the training. In both runs, every third participant was a female. It is a very good result compared to other offers. The Leadership-Training seems to be interesting for young female students.
Conclusion

In September 2009, the first Leadership-Training started and was absolutely successful. We had much more than 15 applications and students were already on waiting lists for the next run. The Leadership-Training has and will be constantly developed by the Centre for Entrepreneurship and the Career Services of the Wismar University. The interview results (evaluation of the course) are used for suggested improvement. One result after the first run of the Leadership-Training was a decision to add an outdoor training as team training in the second run. The goal is to show students what it means to motivate a team and to develop trust, even if they do not know people well. Participants learn that it is easier to trust and to follow somebody with a clear structure and a good way of communication. Participants feel the difference between having a strong motivate team behind than to stay all alone.
The evaluation also has functions like innovation, optimize, legitimation, prognosis, decision as well as control (Kailer, 2006). Because of the interview results, internal and external discussions are going to replace parts in the following period. Instead of the simulated business game at the second module, we expand the thematical motivation and communications, as well as conflict management. In addition, we will also have an exchange between experienced entrepreneurs and future leaderships. There will be a possibility to discuss different point of views, as well as get real impression on what it means to be in a leadership position.

Because of so many applicants, we thought about an assessment system for the Leadership-Training in 2011. It could be a program for the best students for all three faculties to support future elite entrepreneurs.

References


Student Research and Development Teams at the University of Wismar

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Abstract

Entrepreneurship has become a mainstream at the Wismar University. In January 2009, the Wismar University established – Centre for Entrepreneurship (CfE) as the coordinator of all entrepreneurial activities at the University. The CfE is a central unit of the University management. One of the prominent activities of the CfE is the establishment of interdisciplinary student research and development teams for students, it is an expanded possibility of interdisciplinary teamwork and practical experiences. Our University improves its own integration into the regional economy. The starting point is to find technology-oriented enterprises or application-oriented research institutes with market-oriented product or service ideas. This idea has potential for further development of the enterprise or institute, but daily work and/or human or financial resources do not let the time to realize it by themselves. The next step is to find students from different faculties who are interested to work on such ideas. The enterprises or institutes choose “their team” among the interested students (personal choice), and they provide technology, workspace and supervisors. Some additional costs, can be funded by the Ministry of Economy of our state. The economic exploitation of the results can be done in accordance with agreement between the enterprise and its student team, up to a new business. The CfE supports all processes and helps with communication between enterprises and students.

Keywords: University-industry co-operation, entrepreneurship, interdisciplinary education and research
Background

Every university, especially entrepreneurial-oriented universities, has the task to profile itself in its economic region. The economic environment of the Wismar University is predominantly characterized by small companies with less than 100 employees and a high diversity of businesses. Most of these small companies reach their human and financial resources by developing new products. In fact, important developments are delayed or at risk.

The Wismar University with its three faculties – Engineering, Business, and Design – has the best conditions to work on product or process oriented economic developing projects in such an economic structure which is divided into small sections. Furthermore, innovations can only achieve on a market through the cooperation of product developers, product designers, economists and professionals for marketing. Therefore, it is the strategy of the Wismar University to convey its student’s interdisciplinary entrepreneurial skills.

Discussion

Interdisciplinary Teams of Students

In 2009, the Wismar University started the first interdisciplinary research and development teams (R&D Teams) in Mecklenburg – Western Pomerania. These teams are new innovative instruments to convey entrepreneurial skills. Students from different branches of study work together in interdisciplinary teams for at least one semester on the process of developing and implementing an economical idea. Companies and research institutions have the responsibility for “their” teams and provide them with know-how and working space. Additionally, every team is provided with a special promotion by the European Fund for social projects.

The implementation of the R&D Teams provides the following actions:

- Locate interested companies or research institutions which have an adequate idea and the capacities that are necessary to coach the teams. Every year, two application-oriented ideas are started.
- To draft an appeal for the students to apply for working in such an interdisciplinary team (this has to happen within a month).
- To screen all applications received and forward them to the enterprises with initial ideas which pre-select the candidates.
- Kick-off-meeting: The enterprises with initial ideas form up their teams. These teams should consist of three to five students from at least two faculties.
- The teams work together among the professional supervision of the enterprises with initial ideas. In addition, professors offer support to students as well. The CfE accompanies the process for the Wismar University and supports the public relations of the teams.
- After one semester the teams and the enterprises with initial ideas present their conclusions in public. As a special guest, the Ministry of Economic Affairs Mecklenburg- Western Pomerania are invited.

The teams had to deal with ambitious and complex tasks, which mostly don’t belong to their studies. They had to find an adequate market niche and had to define product standards. Existing solutions had to be adapted to the demands or had to be enhanced. In addition, marketing strategies and financial solutions has to be developed. It was the task of the students to search for holistic problem solving. At the same time, the different team members have to organize their studies with their work in interdisciplinary teams. The different timetables and study collocations were also a great challenge for the students.
Win-Win-Situation

The companies can combine their own research potential with the fresh ideas of the students. They can benefit from the resources of the Wismar University and through the supervision of the R&D Teams could recruit high potentials. For the students, the work in such teams afford the opportunity to gain additional entrepreneurial and practical skills. During their time in the R&D Teams, the students are working interdisciplinary on real research and development projects at which they can collect precious references and enhance their career chances.

Also the Wismar University gains new approach by using the research and development solutions. Therefore, the Wismar University can also enhance attractiveness for the cooperation with external partners. In fact, inventive talent is combined with entrepreneurial spirit. With the support of economic partners, entrepreneurial skills are conveyed. Supplementary long-term, technology-oriented and innovative start ups at the Wismar University are implemented with the support of economy.

Teams of the Year 2009

For the first run we could gain one external research institution and one research institution of the Wismar University. The Hydrogen Institute of Applied Technologies (HIAT) is an institute that researches and develops components and solutions for fuel cell technologies and can be found in the capital city of Mecklenburg-Schwerin. HIAT offered its team the possibility to work on marketing chances within the range of hydrogen technology.

On the other hand we could gain the institution for “Oberflächen- und Dünnschichttechnologie” (IfOD) which is a research institute that belongs to the faculty of engineering of the Wismar University. This institution is working on the research of carbon nanotubes which offer new perspectives for techniques of Microsystems. IfOD offered its team the possibility to work on nanosensor systems.

For both teams, ten students were selected. They studies Mechanical Engineering, Economics, Electrical Engineering and Construction Engineering.

The team for hydrogen technology consisted of four students (one student of Mechanical Engineering, one student of Construction Engineering and two students of Business Studies). In cooperation with the knowledge and commercial experience of the HIAT institution they wanted to develop a business model. In fact, the development of an economical realization was more important than the development of a special product. The team and the institution agreed on a milestone plan and work packages until the end of October. During this time, they were also supported by the Center of entrepreneurship. The team started a research to identify the market chances of a platinum free Catalyst Coated Membrane (CCM) and therefore entered the market as the company “goH2”. With the help of HIAT, they created a website and presented their product at the Hanover Fair 2010 where they acquired nearly 20 customers. Hanover fair is the world’s biggest industrial fair.

The team “Nanosensorik” consisted of six students. Three of them are studying Mechanical Engineering, two of them Electrical Engineering and one of them is studying Business Studies. They started with a research to find out the state of the art. In October 2009, the team finally agreed on working on the development of a sensor for hydrogen sulphide. This decision gave four team members the possibility to take part at the most endowed ideas-competition in Mecklenburg Western Pomerania the “Venture Cup-MV 2010” With the help of the IfOD and the CfE, they reached the finals of the best 18 among 43.

Currently, the plans are beyond the term from 2009-2010 and an application for a founder-scholarship is prepared.
Teams of the Year 2009

Table 1
*Milestones of the first run of the R&D teams*

<table>
<thead>
<tr>
<th>Date</th>
<th>Milestones</th>
</tr>
</thead>
<tbody>
<tr>
<td>January/February 2009</td>
<td>• Search for/Application of companies or institutes</td>
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<tr>
<td></td>
<td>• Coordination with possible enterprises with initial ideas</td>
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<tr>
<td>March/April 2009</td>
<td>• Announcement and call for applicants</td>
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<td></td>
<td>• 2 days of representing this special offer at the student cafeteria, short presentations during the lectures in the three faculties, presentation of the ideas at the homepage and on other electronic networks</td>
</tr>
<tr>
<td>28 May 2009</td>
<td>• Closing date for student applications</td>
</tr>
<tr>
<td>August 2009</td>
<td>• Start of teamwork, supervision by the Center of entrepreneurship, identification of acceptation of the R&amp;D teamwork for their studies (for example credit points)</td>
</tr>
<tr>
<td>November 2009</td>
<td>• Application of the team “Nanosensorik” for the competition “VentureCup-MV 2010”</td>
</tr>
<tr>
<td></td>
<td>• The team “Wasserstofftechnologie” is developing a marketing strategy for the CCM</td>
</tr>
<tr>
<td>December 2009</td>
<td>• The team “Nanosensorik” reaches the finals of the best 18 among 43 ideas</td>
</tr>
<tr>
<td>January 2010</td>
<td>• Three team members left the team “Nanosensorik” because of the high work load, the other team members continued the work on their project</td>
</tr>
<tr>
<td>15 April 2010</td>
<td>• Presentation of both ideas in public in front of representatives of the Ministry of Economic Affairs Mecklenburg-Western Pomerania</td>
</tr>
<tr>
<td>19 – 23 April 2010</td>
<td>• The platinum free Catalyst Coated Membrane (CCM) is presented by the team “Wasserstofftechnologie” at the Hanover fair 2010. This product is protected by a patent.</td>
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</tbody>
</table>

Teams of the Year 2010

For the second run of the student interdisciplinary research and development teams we were able to enlist the company “Ingenieurtechnik und Maschinenbau GmbH” (IMG) from Rostock and the Institute for Polymer-Technology (IPT) from Wismar.
IMG is a modern, experienced and innovative enterprise with 110 employees. IMG is a global player and has been act as a system supplier in the range of shipbuilding and the building up of shipyards. The enterprise is searching for alternative markets and has offered the research and development teams the topic, “wind-energy”. Based on an analysis of the product and supplier structure of the leading “wind-energy” manufacturers, a product- development and marketing-strategy shall be derived. Work flow directions could be:

- Market- analysis-product
- Product development strategy
- Design strategy
- Marketing strategy
- The conduction of proposals for the utilization of the local “wind-energy” stakeholders in the regions Bremen and Rostock (wind-energy network Rostock).

IPT is a research and development institute at the Wismar University. It finds individual solutions for the plastic-processing industry. IPT has offered the research and development teams the topic “the artificial ear”. It is a product development in the medical-technical area. For the medical checkup of the sense of hearing of newborn babies and children who are too young to cooperate in conventional hearing tests the otoacoustic emission analysis can be used. In this connection the inner ear generated sounds will be evaluated. The problem is it’s not possible to use the otoacoustic emission analysis on people with a damaged inner ear. In this context, IPT developed an instrument which comes as close as possible to the characteristics of a human ear, in order to do a more objective checkup. This “artificial ear” allows the advancement of the otoacoustic emission analysis and the quality assurance in the clinical practice.

IMG as well as IPT have chosen together nine students and have arranged the teams: 

**Team “artificial ear”** with 3 x Mechanical Engineering, 1 x Business Informatics and 1 x Business Administration and **Team “wind-energy”** with 1 x Mechanical Engineering, 2 x Business Administration and 1 x Construction Engineering.

**Milestones**

The following milestones are important:

**Table 2**

<table>
<thead>
<tr>
<th>Date</th>
<th>Milestones</th>
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| October 2009 – February 2010 | - Search for/Application of companies or institutes  
|                    | - Make contacts with regional enterprises and institutes and the choice of the IMG and IPT |
| 1 March 2010       | - Announcement and call for applicants  
|                    | - Introduction of both ideas and call for action in the three faculties |
| 6 April 2010       | - Closing date for students applications |
| 15 April 2010      | - Kick-off event in connection with the presentation of the results of the first run |
| May 2010           | - Arrangement of the both teams and start of the teamwork |
Conclusion

We have to answer two questions to appraise the previous trend of our model of interdisciplinary student research and development teams with application-oriented research and development responsibilities: Did the incorporated persons take an advantage of this project? How did the incorporated persons act together?

Confirmed by the participating students, there was a very positive respond to the first question. The enterprises or institutes appraise the achieved results as market-oriented and commercial utilizable. All concerned students accentuated their increasing insight in interdisciplinary working and application-oriented research. Furthermore, they appreciated these experiences and references which they compiled during the project as very valuable for their further career. Moreover, it is important to emphasize that the teams of the first run still work voluntary on their projects and that they are willing to do this beyond the specific period. In addition, the Wismar University was able to increase the implementation process of the entrepreneurial spirit and acting in the study courses. Additionally the Wismar University was able to intensify the contacts to regional enterprises and institutes. By now many business enterprises announced their strong interest for this project. They would like to entrust the interdisciplinary student research and development teams with a task as well as they would like to coach the teams. For this reason, our new model has proven itself.

For the response of the second question, we have to focus on three points: the financial scope, the development of the teams and the relationship between the teams and enterprises.

Both teams of the first run utilized their additional funds extensively on their own authority (for instance traveling expenses (visiting booths), an own booth, patent researches and consumable supplies for a breadboard construction). This extended financial scope contributed considerably to achieve the target. The support of the CfE with its experience in state aid was essential.

The process of the arrangement of the student research and development teams took approximately six weeks. The period of time can be explained due to the different curricula of the students. Moreover the students had to become acquainted with the specific requirements of the enterprises. Firstly, the students and the enterprises have to find a common purpose and second, they have to work out different work packages. We have to say that having enough time to find the right place in a team enhances the success of a team. It is important that the team is able to change the team structure in different situations but that requires a high degree of mutual acceptance. Another challenge was to cope with the circumstance that the students were occasionally burdened unequally. The work packages had to allocate in according to the professional qualification of each student and not to the temporal availability. In many cases, few team members were dependent on the results of the other team members. In these potential conflict situations it was necessary for the CfE to moderate and arbitrate between the team members. This led the model to a success story. But the mentoring of the teams took more time than planned at the beginning.

The CfE was able to operate without an influence of self-interests. That was the reason why the CfE was accepted from the teams as well as the enterprises and the institutes as a neutral arbitrator. The mentoring by the CfE was very reasonable to find a common purpose as well as in the context of finding a reconciliation of interests compared to the enterprises and institutes in consideration of the commercial utilization of the results. The CfE had to communicate to the enterprises and institutes that the increase of entrepreneurial skills of the students and their possibility to see into the entrepreneurial processes of the enterprises are very important for the Wismar University. Fortunately, in the first as well as in the second round we were able to achieve a consensus with the enterprises and the institutes. Both teams of the first round achieved commercial utilizable results. Therefore, the participation of the students in the commercial utilization by the enterprises was an upcoming question. We think that this question was part of the learning process and the acquisition of entrepreneurial skills.
The model of interdisciplinary student research and development teams has proven itself in every considerably aspects. Consequently, we are planning a continuation and an enlargement of this project. As of 2011 we will yearly – state aided by the Ministry of Economic Affairs Mecklenburg- Western Pomerania – constitute four student researches and development teams. Therefore the number of Students, which will have the chance to work in an interdisciplinary student research and development team, will redouble. One point that we have to consider in this context is that the requirements for the mentoring will increase in equal measure. In coordination with the Ministry of Economic Affairs Mecklenburg- Western Pomerania, we will increase our mentoring capacity in order to ensure the current level of quality.

The Wismar University ensures with its contacts to the economic system in Mecklenburg-Western Pomerania adequate supplier of complex and innovative tasks for all following student research and development teams. Therefore, the University delivers entrepreneurial-trained students and achieves their task - which was mentioned at the beginning - to gain education and research and become the center of the regional commercial development.

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Sustainable Design as an Innovative Entrepreneurial Approach in Globalizing Context Analysis of the Potential of Environmental Friendly Architecture in the Design Market of the P. R. of China

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Abstract

In the wake of increasing globalization German designers have to engage in international markets, too. German design services are already comprised of unique characteristics, which earned the reputation of being realistic, reliable, and well engineered. However, German architects like most German designers tend to focus on over – engineering and under-marketing. Often they develop cutting edge, new technologies or standards that are very competitive by international comparison, but by focusing on engineering they often forget to translate the quality of their “products” into customer value. Hence, this paper analyses the unique characteristics of German architectural services and evaluates the fast growing market potential for sustainable architectural services in the P.R. China, by using conceptual framework of Normative -, Strategic -, Operational – and Transformative Sustainability Marketing to analyse the potential, approach and application for German architects and designers in the P.R. China. Finally this paper formulates appropriate marketing strategies and practical entrepreneurial suggestions for architects and designers with a sustainable or environmental focus. The research findings are valuable for designers, architects and other entrepreneurs who want to enter the Chinese market as well as for companies that already completed projects in the P.R. China and want to expand or specialize with an environmental focus.

Keywords: Sustainability marketing, green marketing, architectural marketing, German architecture, real estate market in the P. R. China
Background

In line with the advancing process of globalisation architects all over the world are facing fundamental changes for their work. Therefore German Architects need to step into the international markets and bring proof of the competitiveness of their planning services.

In global comparison German Architecture has an image of high quality combined with care and preservation of the architectural culture and heritage. The complexity of the German architectural duties, the depth of commitment to fulfil the contracts and the intention to use innovative technical know-how gives German architects an outstanding position among their competitors in business. The German “Werkvertragsrecht” (Bürgerliches Gesetzbuch, 2009), Law of Contract for the Final Result, obligates architects in Germany not just to plan but successfully conclude their work, e.g. an approved building application or a completed useable building as ordered. This leads to a reputation of realistic, reliable and well engineered architecture.

Today numerous former underdeveloped regions of the world experience a growth in economy combined with a booming building sector. This creation of value within the real estate field must be seen alongside with its possible negative consequences in the matters of ecology, social life and culture. This in turn leads to an increasing responsibility of architects towards sustainability.

Since the 1990’s the PR China is one of the world’s fastest growing markets in the building sector. Forecasts by the World Bank see 50% of all global building activities until 2015 taking place in China (Long, 2005). Facing upcoming grave ecological problems and living through more and more social and cultural changes China develops a significant need for sustainable planning services.

Taking the PR China as a case study market this paper will analyse the methods to improve the customer perception and market standing of the innovative potential of German Architecture in an international context. This marketing approach for sustainable services will focus to the customers.

Sustainability Marketing

Sustainability Marketing integrates social and ecological aspects into the entire marketing process. It includes eco marketing, generating the customers wish for eco products and services and contains long distance tasks like influence on the user’s lifestyle or on politics. In addition the aspects of social responsibility within the Societal Marketing are considered. Enlightened Marketing principles like customer focus, value, and innovation form the base for Sustainability Marketing.

Charter, Peattie, Ottmann and Polonsky (2002) define Sustainability Marketing as a concept beyond Eco Marketing, aiming for a “Triple Bottom Line”. Sustainable solutions are produced and delivered with an increased sustainability value. Customer requests are fulfilled just as third party’s (stakeholders) needs are met.

To succeed in Sustainability Marketing all participants have to live it. The corporate management, employees, suppliers and customers need to act with social and ecological awareness on the normative level, making it part of their business policy. (Corporate Social Responsibility / CSR).

Unique Characteristics of “German Architectural Services”

One way to define German architectural identity can be found in the Honorarordnung fuer Architekten und Ingeniere (HOAI, 2009), the German Law for Architectural and Engineering Fees. Concepts that can be traced back to history like the “Baumeister” or the philosophy of the “Bauhaus” helped to define the phases of architectural services that normally are needed to fulfill the “Werkvertrag”. The “Werkvertrag”, contract for the final result (Bürgerliches Gesetzbuch, 2009), is the contract signed between the client and the German architect. In this very special type of contract the architect’s liability is not only to develop an architectural design concept or drawings of any kind. In contrast to all other
countries in the world the liability of the German architect is far more reaching; it is the building, brought
to completion under the supervision of the architect. He is responsible for all the artistic and technological
qualities required by the client and by the building laws and regulations.

Table 1 shows the nine steps of architectural services defined in the German Law for Architectural
and Engineering Fees “Honorarordnung fuer Architekten und Ingenieure”:

Table 1
Nine Phases of Architectural Services (Honorarordnung fuer Architekten und Ingenieure, 2009)

<table>
<thead>
<tr>
<th>Leistungsphasen</th>
<th>Bewertung In %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grundlagenermittlung</td>
<td>3</td>
</tr>
<tr>
<td>Ermitteln der Voraussetzungen zur Lösung der Bauaufgabe durch die Planung</td>
<td></td>
</tr>
<tr>
<td>Vorplanung</td>
<td>7</td>
</tr>
<tr>
<td>Erarbeiten der wesentlichen Teile einer Lösung der Planungsaufgabe</td>
<td></td>
</tr>
<tr>
<td>Entwurfsplanung</td>
<td>11</td>
</tr>
<tr>
<td>Erarbeiten der endgültigen Lösung der Planungsaufgabe</td>
<td></td>
</tr>
<tr>
<td>Genehmigungsplanung</td>
<td>6</td>
</tr>
<tr>
<td>Erarbeiten und Einreichen der Vorlagen für die erforderlichen Genehmigungen oder Zustimmungen</td>
<td></td>
</tr>
<tr>
<td>Ausführungsplanung</td>
<td>25</td>
</tr>
<tr>
<td>Erarbeiten und Darstellen der ausführungsreifen Planungslösung</td>
<td></td>
</tr>
<tr>
<td>Vorbereitung der Vergabe</td>
<td>10</td>
</tr>
<tr>
<td>Ermitten der Mengen und Aufstellen von Leistungsverzeichnissen</td>
<td></td>
</tr>
<tr>
<td>Mitwirkung bei der Vergabe</td>
<td>4</td>
</tr>
<tr>
<td>Ermitten der Kosten, Mitwirkung bei der Vergabe</td>
<td></td>
</tr>
<tr>
<td>Objektüberwachung (Baüberwachung)</td>
<td>31</td>
</tr>
<tr>
<td>Überwachen der Ausführung des Objekts</td>
<td></td>
</tr>
<tr>
<td>Objektbetreuung und Dokumentation</td>
<td>3</td>
</tr>
<tr>
<td>Überwachung der Beseitigung von Mängeln, Dokumentation des Gesamtergebnisses</td>
<td></td>
</tr>
</tbody>
</table>

The steps 1 to 4 require similar duties as in most countries of the world. Step 5 working - and in
depths detail drawings already go far beyond what is expected anywhere else. Virtually every detail of the
whole building has to be displayed not only showing the design and architectural features but also
clarifying all technological parameters. The importance of step 5 working- and in depths detail drawings
is also reflected in its proportion of the total fees.

Just as well the subsequent steps 6-9 outperform in global standards. Being worth 31 % of the total
fees step 8 guarantees a high amount of monitoring during the building process resulting in major
construction quality, while step 9 stands for quality assurance during follow-up care.

This common 9-step-program combined with extended responsibility for successful working results
leads to an extraordinary commitment of German Architects. This tenor is highly appreciated in the PR
China, especially as it comes with a law-abiding attitude and technical as well as functional perfection.

To sum up it is this unique combination of the self-image of the German “Freie Berufe”
(independent professions), including the requirements for technical quality and ethical responsibility, and
German politics with an ecological and social orientation, that form the base for German architects to succeed on the sustainability market.

**Market Potential for Sustainable Architectural Services in the PR China**

In April 2005 Wang Guangtao, the Chinese Minister for Building and Planning framed the governmental attitude towards sustainable building in the PR China in front of the UN Commission as follows:

“Achieving sustainable development is an important and pressing task faced by all countries in the world. Since the conference on Environment and Development and the World Summit on Sustainable Development all countries have made important strides in coordinating and harmonizing economic development with efforts in the fields of population, resources and the environment….However, at the same time the degradation of the global environment has shown no signs of reversal…. The government (of the PR of China) is committed to building a harmonious society…. by implementing a balanced approach to development: balance between urban and rural development, balance among regions, balance between economic and social development, balance between development and nature” (Wang, 2005).

Two years later Hu Jintao, the General Secretary of the Central Committee of the KP China, called for an “ecological civilization” at the 17th National Congress in October 2007. China Daily, the official Chinese-English Newspaper defined the essential significance this call has related to the guidelines for the future ecological development of the PR China:

„It is not a term the Party has coined just to fill a theoretical vacancy in its socialism with Chinese characteristics, but rather a future-oriented guiding principle based on the perception of the extremely high price we have paid for our economic miracle.

This concept reflects an important change in the Party’s understanding of development. Rather than emphasizing economic construction as the core of development as it did in the past, the Party authorities have come to realize that development, if sustainable, must entail a list of elements including the right relationship between man and nature” (China Daily, 2007, p. 10).

There is an urgent need for action, as the speeding economical progress in China fuels the already existing environmental problems. Besides energy efficiency and preservation of resources, it is the sustainable planning and building business the Chinese government has its eyes on, visible in new laws, regulations and promotion through government aid. A general environmental awareness is arising, supported by the daily press, forming a new market with remarkable chances for planners and architects.

**Conceptual Framework**

Belz and Karstens (2005) include in their conceptual framework for Sustainability Marketing six steps: analysis of socio-ecological problems, analysis of consumer behaviour, Normative-, Strategic-, Instrumental- (Operative) and Transformational Sustainability Marketing:

The analysis of socio-ecological problems takes place on a wide common level as well as on the product. The product-related socio ecologic impacts have to be considered for the whole life-cycle of the product.

According to Erich and Holdren (1971) the environmental load caused by humans is a result of the factors population, affluence/per-capita consumption, and technology. Out of this they generated the IPAT Formula: Impact = Population x Affluence x Technology

Turning towards the PR China this results in the following:

- **Population**
  The PR China is the most populous country worldwide, having 1,328,630,000 inhabitants in 2008 (United Nations Statistic Division, 2008).
• Affluence
  In 2002 already 239.000.000 inhabitants belong to the “Global Consumer Class” (Gardner, Asadourian & Sarin, 2004)

• Technology
  In the PR China the input side (consumption of resources per unit of consumption) as well as the output side (environmental load per unit of consumption) add up to the environmental pollution. (German Embassy Beijing, 2008)

The factors population and affluence are given and increasing facts. With its fast growing number of consumers the PR China has a significant impact on the local and global environment. Nevertheless technology is the most substantial factor here. Efficiency of resources must be improved. Hence a market for energy efficient buildings is forming (Finance Sina, 2006).

Conventional Marketing leads to consumption and a materialistic lifestyle, while Sustainability Marketing may assist the development and spread of sustainable solutions and products.

In the second step the consumer’s behaviour needs to be analysed, also focusing on social and ecological problems. A successful marketing for sustainable services and products has to provide an ad-on value in comparison with the additional costs. Individual and situational factors, like an individual cost-benefit-analysis, influence the customer’s decision for purchase. Diverse customer’s groups need individual analysis: socio- ecological active, socio-ecological sensitive and socio-ecological passive. Each group requires its special marketing approach regarding the consumer’s needs. Therefore the inter-action of socio-ecological problems and customer’s preferences form the base for Sustainability Marketing.

The third step will look at the normative aspects of Sustainability Marketing. A company’s management and culture are the major factors for the success of Sustainability Marketing (Belz et al., 2005). Corporate Sustainability Mission Statements, goals and principles have to be created and implemented into everyday performance throughout in- and outside the company. The classic market oriented approach integrates customer’s needs, customer’s behaviours and the competitive situation. Additionally there have to be environmental oriented philosophy and objectives in the leadership.

Step number four analyses the strategic consequences resulting from the corporate commitment to sustainable actions. Strategic Marketing supports the basic business strategies of a company. According to Michael Porter (1980) there are three general approaches to gain a competitive advantage: differentiation, cost leadership and segmentation. A sustainability approach may deliver unique features and competitive advantage. Strategic approaches have to be developed for the product- or service- qualities, market segmentation, targeting, positioning, and the strategic timing for market entry (Belz et al. 2005).

The fifth step is the Operative or Instrumental Sustainability Marketing (Belz et al. 2005). First the diverse target groups have to be analysed. Belz, Pant and Sammer (2002) identify three customer groups within the building industry: owners, owners with commercial interest, and non-profit owners. Also developers and investors are additional client groups to be analysed.

For all these diverse customer groups motive alliances have to be developed as well as a Marketing-Mix-Concept for the product design, pricing, distribution and communication. The complete life-cycle of the product “From Cradle to Cradle” needs to be considered, altering the conventional “Cradle to Grave Concept”. The future value of all elements has to be considered. Intelligent use of materials will keep their value in a sustainable recycling process. (McDonough & Braungart, 2002).

Finally step number six, the Transformative Level according to Belz (2005), will result in changes in public business conditions and political framework. Traditionally the Macro Environment formed the base for marketing. As this framework has often a negative impact on sustainable buying behaviour, the general business conditions within the Marco Environment need transformed to foster the marketing of sustainable products beyond their market niche successfully.

Now the four-step marketing concept including the Normative, Strategic, Operative and Transformative Level can be combined with the components of ecological, social, cultural and
Results and Discussion

Case Study “Sustainable Low Cost Low Scale Rural Housing Prototype” for New Zhen Shan, Guizhou Province

With the new millennium the PR China set off to find a balanced way of economical growth and sustainable development, balancing urban and rural progress, economical and social improvement, as well as growth and use of natural resources. Therefore the Ministry of Science and Technology of the PR China started a research program for „Green Buildings in Cities and Small Towns“. A project called „Sustainable Low Cost and Low Scale Rural Housing Prototypes for New Zhen Shan“, Guizhou Province, designed prototypical approaches to reduce the migration from the underdeveloped rural areas
to the booming metropolises. Decentralisation was intended to enforce local structures and support traditions (Hackel, 2006).

*Figure 2. New Zhenshan Rendering (Mertes & Hackel, 2007)*

*Figure 3. Topping Out Ceremony (Hackel)*
The New Zhen Shan Research Project provided essential conclusion for Sustainability Marketing for German architectural services as follows:

- The potential of sustainable architecture and the marketing strategies for sustainable architectural services in the PR China have to be differentiated between the rural regions and the booming development areas.
- Marketing for sustainable architectural services in the rural regions of the PR China will be difficult for the coming years due to primary market resistance and the all-dominant issue of cost-efficiency.
- The particular interest groups have diverse values, needs and goals. To succeed an individually designed niche marketing has to be tailored, differentiating the Marketing Mix and the Communication-Level-Mix (Hackel 2009). A standard marketing strategy for all parties involved has to be avoided.
- Within the level „village“ the unsuccessful factor sustainability had to be replaced by the topics of costs and quality of use.
- Within the level „involved administration“ the factor sustainability was established successfully as equal positioning because it provided assistance in meeting the political guidelines of the central government and.
- Within the Ministry of Science and Technology of the PR China sustainability succeeded as a dominant profile. In rural areas the government is the most potential client for sustainable planning services.
- The political guidelines of the central Beijing administration had mayor influence on the success of the project. Moreover the assistance of the Ministry of Science and Technology enabled the realization.
- Besides the focus on rationality, emotional and moral arguments were used successfully depending on the aim of the communication.
- The success of the whole project was closely connected to communication and consequently the Communication-Level-Mix. Therefore “Guanxi”, a relationship network of the Chinese project-partner, was of high significance.

Marketing Strategies and Entrepreneurial Suggestions for Architects and Designers with a Sustainable or Environmental Focus

Being specialized in sustainable architecture can be an essential advantage within the global competition. The self-image, sense of responsibility for technical quality and ethics, the long-lasting socio-ecological politics plus the above-mentioned characteristics of German architectural duties predestines German architects to succeed in sustainable architecture. Therefore Germany and its architects can fulfil a pioneer task in sustainable development.

But sustainable design as an innovative entrepreneurial approach has also a global potential: Environmental protection and sustainable development belong to the mayor challenges of the 21st century and will be observed throughout the world. An ecological orientation owns economical potential, which will be of growing interest in the building business. Not only in Germany but also worldwide this interrelation is recognized.

Sustainable development is a central political topic for the PR China, based on the country’s urgent social and ecological problems. New concepts for sustainability in architecture, urban and rural development are needed because of the ecological and social transformation in the PR China, enforced through political pressure on those in charge. The goals and guidelines of the central government are reflected in the local building business.
Sustainability Marketing cannot be seen as a universal remedy used on all projects and clients in the PR China. In general sustainable German architectural services are not automatically welcomed by all Chinese clients, not even as “innovative products” Often ecology collides with the superficial question of costs. Nevertheless effective approaches for Sustainability Marketing can be generated, tailored for the target group and market segment.

This academic analysis leads to the conclusion that there is no unique or standardized strategy to gain competitive advantage in the market for architecture in the PR China through sustainability marketing. To dismantle prejudices and market barriers and forge links to new customer groups the following conclusion for successful sustainability marketing may be considered.

**Sustainable architecture in PR China.**

In general Chinese clients have various definitions and interpretations of sustainability. Applied to architecture these understandings not always follow the ideas of the Agenda 21 or the United Nations Conference on Environment and Development (Rio Summit), but is equated with ecological or “Green Architecture”.

Many clients are irritated and put off by the additional dimension of socio-cultural sustainability to architecture. Furthermore there is a political double edged connotation for socio-cultural sustainability within the PR China, whereby sustainable “Eco-Products” are easier to merchandise than socio-cultural ones.

In the eyes of the Chinese clients sustainable architecture has to be “economical sustainable”, as this interest is omnipresent. Economical sustainability is often misunderstood as a kind of short-term optimization on the return of the initial investment. Therefore it is necessary to ensure that through the process of marketing, acquisition and the course of the project German architects and their Chinese clients follow the same intention on sustainable architecture.

**Sustainability marketing as market focused management tool.**

Successful Sustainability Marketing in the PR China can not be reduced to advertisement and distribution, but has to be a market-orientated business management tool. It is the base for architects to build up an office culture and philosophy focused on strategic long lasting customer relation development.

Sustainability Marketing helps to analyse the needs of customers and users and develops the design following these insights. On the one hand active adaption to these needs take place, on the other hand there is a positive influence on and further development off the customer’s behaviour.

**Intercultural understanding and Guanxi.**

All activities within the PR China need understanding and acceptance of the Chinese culture as well as the balance and compromise of cultural differences.

German architects need to bring in transcultural flexibility and intelligence, modulating their familiar ways of thinking, planning and realizing projects. The assignment of a Chinese partner helps to cut the costs due to low labour costs and provides synergies during the acquisition and design phase due to the closeness to the clients. Additionally the Chinese partner will provide a cultural input that enables a successfull intercultural communication and a sensible adjustment of the design and the realization process and therefore helps to guarantee high quality.

Chinese partners can support the formation of the Chinese network of Guanxi, which is essential for a long-term success in the PR China. Thus the selection of the associate local partner or subcontractor has a mayor influence on this success.
Communication as a key point.

Communication for architectural services in the PR China is very complex, as it has to be planned strategically. It has to consider all affected levels individually (communication-level-mix), using ideally successful projects as references, as rational arguments are preferred by all levels and target groups.

Timing for innovation marketing.

At present the Chinese market for sustainable architecture is still a niche market with little acceptance and affected by demand-related market barriers. Hence German architects must consider that the timing for a market entry on the sustainability sector is currently unfavourable.

There will be an increase in costs for acquisition and planning optimization, but it will be rewarded with a secured market position at an early stage. The entry into new markets should never be initiated as a solution for business problems on the home market like drop in orders or deficient income. The opening up of the market for sustainable architecture can only be successful being based on a structural and economical healthy office, as the fees for the more complex sustainable design services are unlikely higher than on conventional projects. Only projects with a referent power, called “Leuchtturmprojekte” (lighthouse projects) may provide additional income. Financial risks and inevitable additional investments should be considered.

Legal limits.

Due to legal and/or economical reasons Chinese clients generally tend to assign only the conceptual design and in rare occasions enlarged design and parts of the detail design. This results in a reduction of the calculated total fee and is in contradiction to the required quality assurance for sustainable architecture.

Influence of politics.

The real-estate market in the PR China is substantially influenced by politics. The official guidelines, especially the one’s by the central government in Beijing, have to be closely monitored while planning strategies. Over the past years the political “push-factors” set the course in favour of sustainable architecture.

Political measures since 2004 against an overheating of the real-estate market influence the consumer’s attitude, just as well as the glut on the market in several sectors of the boom-regions and the global economical crisis in 2008. This all leads to an economic recession in parts of the real-estate sector and a tightened competition among the planners. The relevance of additional value through sustainability is an essential decision-making factor in the sector of high-priced high-quality property purchase.

Niche marketing.

Sustainability Marketing for architectural services in the PR China needs to be a tailor-made niche marketing for the urban boom regions. Every potential target customer has to be addressed individually.

Preferentially the socio-ecological active or sensitive are the target groups, as Sustainability Marketing can be more successful with planners and clients sharing the same attitude towards sustainable architecture. At this time these target groups are still small in number in the PR China, nevertheless there is potential capacity among politicians and investors. To increase the demand politics and science have to pave the road focusing on the ecological and social problems in the PR China.
Public clients and clients with a long-term perspective of own use carry the major potential for Sustainability Marketing for Architecture in the PR China. There is an advantage for German architects, as the same clients attracted towards German culture and quality are often interested in sustainable architecture, too. Accordingly motive alliances should be used for the marketing process.

Being still a niche product on the Chinese market, in most cases sustainability for architecture can only be a flanking profile for the project. Sustainability as the dominant characteristic will only work for especially targeted projects, used for clients with the same focus.

According to evaluations on parallel market developments of sustainable products (e.g. the food sector) a tendency for the market opportunities for sustainable architecture is visible. The possible future development will allow to step out of the limited niche and open up new market segment and customer groups.

Conclusion

This paper analyzed the today requirements for Sustainability Marketing as an innovative competitive advantage, using German architectural services for the PR China as an example. Summing up it is ascertained that Sustainability Marketing is a capable approach to open up the Chinese market within the global competition. Even though Sustainability Marketing for architectural services in the PR China has to deal with market resistance, there are successful marketing strategies for selected market segments and target groups.

It is an essential perception that the real-estate market, as much as all other markets in the PR China, is a subject to a fast and continuous change, where the modifications of the basic conditions proceed parallel to German architects unknown speed. So all strategic and operative approaches in sustainability marketing need to be evaluated and readjusted permanently. This applies in particular for the individual Marketing Mix and the Communication-Level-Mix. Research on these issues has to be continuous. The science-based parameters and adequate instruments have been described.

It would be insufficient just to monitor these modifications for sustainable services and consequentially reconcile the Sustainability Marketing. The economic and political Macro Environment of the PR China is in flux and can and should be influenced in terms of sustainable architecture through lobbying in environmental and social politics. Influence on the macro environment should not be based on prejudice and guesswork. Instead architects using research results must win the politicians and the industry as partners for sustainable projects in the PR China.

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Building a University Culture of Innovation

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Abstract

The University of Queensland is Australia's most successful university for industry engagement and achieving commercial outcomes from research. Its main commercialisation company, UniQuest, is regarded internationally as a leader in university research commercialisation. The two key factors in The University of Queensland's success are strong leadership and support for commercialisation from the University’s senior management, and a strategy that reinforces innovation as part of the research process. The paper will explore how The University of Queensland has developed a research culture that embraces innovation and that has taken the university to a position of international leadership in commercialisation. Integral to this culture at the university is the system of placing a Manager, Innovation and Commercial Development in all academic units within the university, spanning all discipline groups. The Managers, Innovation and Commercial Development are employed by UniQuest with their salaries co-funded by the Deputy Vice-Chancellor (Research) and the relevant academic unit in which they are deployed. This ensures that each Manager prioritises serving the interests of their particular academic unit and the university as a whole, as well as meeting commercial targets. Through this embedded model, academic units, individual staff and research higher degree students are strongly supported to respond to The University of Queensland's stated key objective of furthering its position of leadership in commercialisation. As a clear demonstration of success, UniQuest has now been contracted to provide commercialisation services to four other Australian universities and a medical research institute.

Keywords: Innovation, commercialisation, research excellence
Background

The University of Queensland (UQ) was established as a state university in 1909. The main campus is in the city of Brisbane (capital city of the state of Queensland) and there are three other major campuses and over 50 other operational sites throughout the state. The University now comprises over 40,000 students, including 9000 from 128 different countries. More than 6000 staff are employed, including 2600 faculty, and the operating budget exceeds US$1.2bn per annum.

Innovation is at the core of the University’s operations and this is expressed strongly in the strategic plan.

Engagement through mutually supportive relationships with the wider community, industry, commerce and government by:

- Building on the University’s academic strengths, in strategic partnerships with external agencies, including industry, business and professional groups and with instrumentalities at city, state, national and international levels, helping to find and promote innovative and sustainable solutions to community challenges.
- Advancing the University’s leading position in knowledge transfer and commercialisation.

(University of Queensland Strategic Plan 2009-2013)

The University of Queensland established its main commercialization company, UniQuest, in 1984, and over the 26 years since its formation it has grown to be recognized as Australia’s largest and most successful university commercialization company (AVCC 2004). Sales of products using technologies licensed by UniQuest now exceed US$5 billion annually, as confirmed in a survey of licensees of UniQuest managed IP, most recently conducted in 2010. UniQuest comprises more than 80 staff, manages a portfolio in excess of 1500 patents, and has formed over 50 companies. (UniQuest 2009)

As a clear demonstration of confidence in the UQ – UniQuest commercialisation model, over the past five years four other research intensive Australian universities have entered into agreements with UniQuest to provide their research commercialisation services. The four partner universities are The University of Wollongong; The University of Technology, Sydney; James Cook University and The University of Tasmania. UniQuest also manages commercialisation of research generated by two UQ led Australian Research Council Centres of Excellence, which have research nodes in seven other Australian universities. This model of commercialisation services being provided by one university controlled entity on behalf of multiple partner universities is unique in the world.

Discussion

The Case for Innovation and Research Commercialisation

“We have known for several generations that innovation pre-eminently determines our prosperity” (Cutler, 2008).

A Business Council of Australia study highlighted that even at best practice levels, the higher education sector is unlikely to generate more than 10 per cent of its total research revenues from commercialisation. Note, this best case scenario is only the percentage of research revenues, which in a research intensive university are typically of the order of 25 – 35% of total operating revenues. Therefore, any strategy reliant on simply taking technologies to market for revenue raising purposes is unlikely to be sustainable. However there is a broad economic benefit through the activities of companies that
successfully engage with university research and use the outcomes of publicly-funded R&D. This in turn creates a virtuous circle as these companies grow, contribute to an expanding economy and re-invest in further research projects.

The study goes on to identify the key elements of the synergistic relationship between universities and business that is required to create a positive commercialisation environment.

**Universities.**

- Universities should have a clear mandate to engage in the commercialisation of research and this should be acknowledged as a legitimate third role for universities alongside teaching and research.
- Universities need to be producing excellent research, as it is excellent research that is most likely to generate the most significant commercialisation opportunities, and need to publicise their research capabilities.
- Universities need to be undertaking research in areas that fit with the interests of business.
- Universities should exercise their IP ownership rights, ensure IP ownership is clear and take appropriate steps to protect IP.
- Universities wishing to effectively commercialise should empower a central commercialisation entity to manage the commercialisation of university research. These commercialisation entities must be appropriately resourced to allow them to: (1) identify and protect IP; (2) pro-actively identify commercialisation options; (3) disseminate information regarding research activities to business; (4) fund the further development of research to the point at which it is commercialisation ready; (5) negotiate deals; and (5) manage risk.
- University councils should not be involved in the micro-oversight of commercialisation activities.
- University governing councils and senior management should be committed to developing a culture, and systems for the reward and recognition of staff, that encourages commercialisation activity.

**Business.**

- Business should identify need for innovation and options to achieve this.
- Business should be able to engage with universities to pursue commercialisation opportunities where the university research is aligned to their product and service areas.
- Business should recognise that universities can access global markets for IP if local business is unable to use it.

The key elements of this synergistic relationship between universities and business are the recognition of commercialisation as a legitimate academic pursuit, the maintenance of research excellence, alignment of business objectives with research priorities and acknowledgement of the global market for ideas and talent.

Limitations to the full development of this relationship arise from variable levels of business investment in research and development, and lack of time and incentive for faculty to develop contacts with and meet the expectations of industry partners (Yencken & Gillin, 2006)

It is most important to recognise the need for involvement and coordination of multiple stakeholders across the value chain from research bench to end user (including governments, investors,
scale up enterprises, regulators and marketers). University technology transfer/commercialisation companies play a key role in managing these diverse relationships (Kapeleris, 2010).

In the context of university research and innovation utilising public funds, there is frequent debate about the extent to which resulting intellectual property should be made available to the public for free. It can be asserted that maximum gains can be realised by ‘open innovation’. There are two major counter arguments to this position. Firstly, publicly funded research in one country can be commercialised by entities in another country without any commercial return to the originating country. Secondly, many technologies require significant investment and development before they are appropriate and attractive to markets, and investors are not inclined to make the necessary investments unless the intellectual property is properly protected, and title of ownership clearly identified (Gilmore, 2009).

As we move into the post Global Financial Crisis period, the focus on investment in research and links with industry, commerce and governments is even more crucial. The GFC can be regarded as both a threat and an opportunity. A threat, in that without an adequate and coordinated policy response that is robustly evidence based, the global economy will be left exposed to the risk of a repeat or worse. An opportunity, in that investment in research and innovation is the type of investment that creates growth and jobs in the medium term (Geoghegegan-Quinn, 2010).

The UQ Strategic Approach

Over the past 15 years, UQ has been on a steady upward trajectory, rising from about 10th place ranking in Australian universities by most conventional measures of research performance (research revenues, publication outputs, graduate student completions, success in nationally competitive research grants), to now being consistently ranked 2nd or 3rd in Australia, depending on which measure is referred to. This has been achieved through building scale and focus in research excellence, with the development of dedicated research institutes, major investment in centrally managed large scale research infrastructure and facilities, and proactive recruiting strategies to attract and retain world class research talent.

Running in parallel with this pursuit of research excellence has been a well developed strategy to promote a culture in support of the commercialisation of research. The university governing council (Senate) and the university President (Vice-Chancellor) and all senior executives effectively communicate that commercialisation is a core activity of the university. This has been consistently articulated through:

- strong IP policy that asserts university ownership of IP, and provides a framework for effective management of the requirements for appropriate IP protection and the academic priority to publish and promulgate new knowledge
- a clear incentive scheme where the net proceeds of commercialisation are distributed 1/3 to the inventor, 1/3 to the academic organisational unit and 1/3 to the central university
- public acknowledgement of commercialisation successes
- recognition of commercialisation outcomes in faculty appraisal and promotion (eg sealed patents given equal weight with high impact publications)
- active encouragement for the appropriately resourced application of university facilities and staff to undertake research directed at moving technologies and products along defined commercialisation pathways
- internal research grant schemes that provide seed funding to support strong and effective engagement with industry
- strong support from academic leadership for participation in commercialisation seminars and workshops, especially by early career researchers and graduate students
The university is committed to the creation and transmission of new knowledge, and it is readily accepted across the university’s research community that one effective and efficient vehicle for this transmission is through commercialisation.

The UniQuest Model

Until 1995, UniQuest operated very much as a traditional university technology transfer operation. It had limited resources and an imperative to generate its own cash to fund its operations. There was a heavy reliance on consulting income and very rapid assessments of intellectual property were required to determine if it could be licensed. The licences generated very little revenue, if at all, because the intellectual property was inevitably being licensed at such an early stage.

The process illustrated in the following diagram was focused on quickly moving to a licence or not doing anything to develop the intellectual property. As a result, very few deals were done.

Figure 1. Technology commercialisation at the University of Queensland in 1995 – The conventional university technology licensing office process.

From 1996, the direction of UniQuest began to change. UniQuest’s then Managing Director looked into a report from MIT on the economic benefits of licensing technologies to start-up companies in the Boston region. The study (Pressman et al 1995) showed that there were significant benefits in creating valuable, job-generating businesses by establishing companies and licensing to them to develop the intellectual property, thereby building value rather than licensing out too early. With the establishment of a start-up company, there is an immediate value created when you receive shares in the company.
On the basis of this strategy, the UniQuest Board gained approval for an investment of A$5m by the University to create a reinvigorated UniQuest that would have the capacity to create start-up companies and could focus on building long term value in UQ intellectual property, rather than short-term cash. The funding was utilised to:

- create a pool of staff with expertise in creating new ventures
- develop a pre-venture capital investment fund jointly with the University of Melbourne to invest in these new ventures
- take over patent costs, and enable UniQuest to access the legal, financial and marketing expertise to do superior licence deals and create new ventures
- ultimately, to accelerate the development of intellectual property and obtain value early through equity (shares) in new companies.

Possibly the most significant change, was the creation of the Manager, Innovation and Commercial Development (MICD) positions.

Establishing the MICD model at UQ was a process of learning by doing. Initially, UniQuest and UQ experimented with embedding a UniQuest staff member in research areas of the university with 100% of the salary paid by UniQuest. This was not successful because the person’s loyalty was solely to UniQuest, and the UniQuest staff member came to be regarded as a ‘foreigner’ who had been ‘planted’ in the university research group. The second attempt was the reverse - a 100% university employee embedded in UniQuest. This person was not accepted by UniQuest staff as a colleague and was similarly regarded as a ‘foreigner’ without the requisite understanding of commercial drivers.

The current MICD model, implemented in full over the last 5-6 years, has each position as a UniQuest employee but salary and other costs are drawn from three sources:

1/3 UniQuest
1/3 Faculty/Institute they are assigned to – academic organisational unit
1/3 Vice President (Research) – central university

Quite explicitly, the MICDs are required to represent the interests of UniQuest, the academic unit they work with and the University’s central strategy for research, in line with the University’s policies and procedures. The MICDs are the UniQuest ‘spokes’ who work with technical experts in the ‘hub’ to bring commercial projects to the market.

It has to be acknowledged that not all MICDs have successfully managed the three stakeholders in their role consistently and optimally over time. Problems have occurred when a MICD views their role as having a quasi-regulator role on behalf of the university. Problems also emerge where the MICD is only interested in trying to win major commercial deals, thus disenfranchising significant numbers of faculty. All the stakeholders need to feel that the MICD is providing value for the model to be successful. Whilst the formal employment relationship is with UniQuest, the KPI setting and annual performance review is undertaken in consultation with senior management of the other two stakeholders.

The evolution of the MICD model is further evidence that UniQuest has had the time necessary to be able to make mistakes and learn from them. In the high risk business of commercialising university research, UniQuest still makes mistakes on a regular basis. Constant vigilance is required to ensure that the researcher’s interests are kept paramount. When technologies are effectively taken out of the hands of researchers and developed without their direct involvement, future development and investment success is severely jeopardised. It is fair to say that this was a strong tendency in the early days of UniQuest, making it more difficult to establish legitimacy in the academic community. It is a continuing major source of problems for technology transfer companies in other universities.

Selecting a MICD requires careful consideration and can be a long term process as UniQuest and UQ senior management jointly ensure they select the right person for the role. Fortunately, experience
employing MICDs over more than ten years has given management greater confidence in identifying the personal attributes, skills and experience required for the role.

One of the biggest risks that remains is attempting to pick winners to invest in. There are many examples of lost opportunities on the one hand, and outstanding successes from ‘orphaned’ technologies on the other. UniQuest relies on a broad IP disclosure pipeline, and a careful risk spread strategy to maintain profitability and sustainability.

A key element of the UQ-UniQuest MICD model is that it is comprehensive and includes all parts of the University, from engineering to humanities, biomedical research to music. The ‘hub’ and ‘spoke’ approach also forms the basis of the services UniQuest is providing more recently to other partner universities and research organisations.

Figure 2. Techcom Organisation

![Techcom Organisation – Hub & Spokes]

Annual commercialisation workshops run by UniQuest for research students and staff provide an opportunity to raise awareness of commercialisation and promote cross-disciplinary collaboration. There are many examples where projects discussed at the workshops have gone on to become commercialisation successes. The workshops also enable researchers to get to know UniQuest staff.

Having the MICDs (the ‘spokes’) embedded in the academic units in UQ and other partner institutions, working alongside researchers with grant applications and providing advice on intellectual property matters, has resulted in a steady increase in the number of commercialisation opportunities being disclosed each year, as shown in the graph below. Disclosures of potential technologies are reported
formally in the monthly TechCom (technical communication) meetings of MICDs. Disclosures are then assessed by the UniQuest Patent Review Committee, which makes initial assessment of intellectual property protection and commercialisation strategies. While the vast majority of these opportunities do not become commercially successful, it demonstrates the extent to which UniQuest has become accessible to researchers.

Figure 3. Innovation disclosures from 2001 to 2009

![Increasing Innovation Disclosures](image)

MICDs are selected to have a strong background in commercial experience, an empathy and understanding of the research environment and preferably a PhD. It is most important that the MICD is able to provide an effective bridge between the university research culture and the priorities that drive business. This involves management of expectations between the different parties and establishing effective channels of communication to allow productive working relationships to develop and thrive.

**Research Commercialisation Case Study**

Cervical cancer is the second most common cancer in women and kills more women than any other cancer. There are 466,000 cases of cervical cancer per year worldwide (Alliance for Cervical Cancer Prevention 2010). Human Papilloma Virus (HPV) strains are responsible for an estimated 70% of the incidents of cervical cancer.

Screening for, and treatment and follow up of HPV related diseases costs the US health system ~$5 billion per year (BNet Australia)
UQ researchers Professor Ian Frazer and Dr Jian Zhou invented the vaccine to prevent HPV infection, thereby providing the means to ultimately prevent up to 70% of cervical cancer cases. The vaccine was developed and marketed by CSL (Australia) and Merck Sharpe and Dohm (worldwide) under the brand name of Gardasil. Gardasil is approved for use in 123 countries, including the US, Canada, Australia, UK, Sweden, Germany, Italy, and France (Medical News Today) - a number of which have established national vaccination programs including Australia. Gardasil is the first vaccine aimed at preventing any form of cancer.

The key milestones in the commercialisation of the Frazer/Zhou HPV vaccine were as follows:

- Patented by UniQuest 1991
- Licensed to CSL(Australia) 1995; sub-licensed to Merck 1995
- FDA approval June 2006; 
- First commercial sale Q2 2006
- Approved for use in 123 countries;
- Sales exceeded US$2B in 2009; predicted to exceed $4.5 billion/year (Merrill Lynch)
- Potential to save 250,000 women’s lives annually (Alliance for Cervical Cancer Prevention 2010)

Merck, CSL and UniQuest have taken steps, with support from the Bill and Melinda Gates Foundation, to ensure Gardasil is available at the lowest possible price in developing countries. To this end, royalties have been waived on sales to 72 developing countries least able to afford vaccines.

Sadly, Dr Zhou died before he was able to see the fruits of his research impact so many lives. Professor Frazer has been recognised as Australian of the Year (2006) and through a number of medical and scientific awards including the 2008 Balzan Prize for Preventative Medicine.

Professor Frazer is now the founding Director of the Diamantina Institute for Cancer, Immunology and Metabolic Medicine at The University of Queensland. The Institute is partially funded by royalties from the HPV vaccine. The translation of research into a successful commercial outcome as demonstrated by Gardasil has been a major factor in UQ securing funding from the Australian Government, the Queensland Government and philanthropic sources for further development of major research infrastructure for the Diamantina Institute, and an associated US$300m Translational Research Institute.

Conclusion

The two key factors in the University of Queensland’s successful development of a culture of innovation are strong leadership and support for commercialisation from the University’s senior management, and a strategy that reinforces innovation as part of the research process. The university’s track record demonstrates a best practice model for building research excellence and highly successful, sustainable commercialisation outcomes.

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Interaction between Explicit and Tacit Knowledge within Organizations

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Abstract

Tacit knowledge is a valuable asset to organizations which is not readily being recognized. The objective of this paper is to explore the relationship between tacit knowledge and explicit knowledge and their interaction when converting tacit knowledge into explicit knowledge. A review is carried out of current methodologies available to organizations for the management of tacit knowledge into explicit knowledge. Case studies are carried out to test a series of interventions designed to promote understanding of knowledge management and the conversion of tacit knowledge into explicit knowledge. Findings reveal that tacit knowledge is not a single entity that can be converted into explicit knowledge, but it can be broken down into elements, which have to be considered independently in order to facilitate the knowledge transfer process. From the evaluation of the research a Tacit Knowledge Spectrum Model is developed to represent the elements of tacit knowledge. The Model gives a clear view of the complexity of tacit knowledge and the interrelationship of the elements that make up tacit knowledge. By creating a better understanding of tacit knowledge and its elements and their interaction with explicit knowledge, organizations will be better placed to manage tacit knowledge and their knowledge capital.

Keywords: Tacit knowledge, explicit knowledge, tacit knowledge spectrum
Background

The Elements of Tacit Knowledge

An analysis of the study data demonstrated that the actual amount of tacit knowledge transferred from an individual was actually relatively low. Although the company made significant gains in increasing the knowledge capital in an explicit form, the total tacit knowledge capital available to the company was far greater than that actually transferred. This research has demonstrated that the release of tacit knowledge was not in a single form, it was broken down into different elements. Three elements of tacit knowledge were subsequently identified, plus a body of tacit knowledge that was available to the individual but very difficult to identify (Figure1).

The identified elements of tacit knowledge have been labelled as:
- The Tacit to Explicit Element
- The Tacit to Tacit Element
- The Triggered Response Element
- Unknown Tacit Element

Figure 1. Elements of Tacit Knowledge

![Diagram of Tacit Knowledge Elements](image)

Discussion

The Tacit to Explicit Element

The findings of the case studies indicate that an element of an individual’s tacit knowledge on a defined subject can be turned into explicit knowledge; this element is referred to as the Tacit to Explicit Element.

When adopting the reflective practice approach either as an individual or in a group environment, the individual is able to recall information such as a process or working practice about a defined subject. In the case of the retiring engineer, working manuals and protocols were produced in an explicit form. Also, safe working practices and protocols for handling glues were identified and produced in an explicit form.

The recalled knowledge is able to be written down or recorded as explicit knowledge in a format that can be used by individuals and added to the company’s knowledge capital. There is an element of tacit knowledge that can be identified at this point as being suitable for transfer straight to tacit knowledge through experiential teaching.
In the case of company B this element of tacit knowledge has been illustrated by the retiring employee who developed a set of documentation detailing schematics, operational details and basic fault finding guides. Where this information had been held previously in a tacit form, it was transferred into explicit material and made available to other individuals throughout the organization. In the case of company A, a similar trend can be seen in the setting up of protocols across the company for glue handling and application. By extracting the tacit knowledge of individuals across the plant and combining it into an explicit form new working practices have been established and standardized in an explicit form which were previously tacit to the individuals.

**The Tacit to Tacit Element**

Through the reflective process, tacit knowledge was identified by individuals that was not suitable to be transferred directly into explicit knowledge due to its complexity; the individual could not process the knowledge into a form that could be used explicitly. This knowledge needed to be transferred straight into tacit knowledge, a Tacit to Tacit Element.

One of the reasons for this type of knowledge conversion was the complexity of the knowledge recalled and the individual’s ability to process it into a form that could be used by individuals in an explicit format. It became apparent when analyzing the outcomes of the case studies that this information needed to be taught by one individual to another experientially. The transferring of this type of knowledge was problematic in that the individual being taught needed an understanding or grounding in the subject matter to be able to process the knowledge. In certain circumstances, training courses were provided to individuals to give them a grounding and understanding of the knowledge base, before the tacit knowledge could be transferred. The process of knowledge transfer for this element of tacit knowledge, needed to be completed through demonstration and experiential learning, provided the knowledge base was sufficient to process the information.

**The Triggered Response Element**

As the case studies progressed, analysis demonstrated that there was an element of tacit knowledge that could only be recalled by the individual through a triggered response, The Triggered Response Element. In order for the individual to recall the trigger response element of tacit knowledge, a trigger was needed for the individual to identify the information to be made available. The trigger response could take many forms and could easily be observed in group discussions. As a subject matter was discussed and reflected upon with colleagues, further knowledge of a subject came to the surface. In certain circumstances, as this new level of knowledge was discussed and reflected upon, the process was repeated in that another layer of knowledge was revealed. The triggered response could also be seen when a breakdown occurred, on seeing a situation arise. The engineer could recall similar situations and how to deal with the problem but he had been unable to recall the previous information through a reflective process. This element of tacit knowledge could then be processed, either into explicit knowledge or straight to tacit knowledge, depending on the complexity of the subject matter. Within the case studies, there were numerous situations where a trigger response was needed for recall; the most obvious case was when dealing with a breakdown scenario. There were many cases of information coming to light that were not recorded or identified until needed by the engineer or technician in a breakdown or pressure situation.

The trigger response seemed to be non exhaustive in the short term, which implied that more tacit knowledge was held by the individual that could not be recognized than that could be recognized and easily processed. Further research is needed to establish the time frame for transferring this element of tacit knowledge and the percentage of knowledge that can be triggered and transferred.
The Unknown Tacit Element

The fourth tacit element is all the remaining tacit knowledge that cannot be readily identified- the Unknown Tacit Element. It was acknowledged throughout the focus groups and interviews carried out in the case studies that all the tacit knowledge of an individual had not been identified. In all cases it was accepted that an individual's tacit knowledge could not all be transferred as it is extremely difficult to identify an individual's knowledge base. The top layers could be recalled relatively easily through reflective practice but as you progress down the layers an external factor such as a trigger is needed for recall. (Clarke et al., 2007).

The unknown tacit element is being represented as a set of ever decreasing rings, the smaller the ring the more difficult to recognize and extract the knowledge. It can be suggested that the inner rings are so personal to the individual that they may never be recognized or shared.

The case study, demonstrates that over time, the outer rings can be recalled and transferred, but as the rings get smaller the time frame for recall extends, such that the unravelling of knowledge takes place over a period of months, if not years. Also an external factor is needed to trigger a knowledge response.

When investigating the elements of tacit knowledge, it is difficult to come up with defined boundaries. There is a crossover between all the elements, and this has to be accounted for in the model. When considering the tacit to explicit element and the tacit to tacit element, this knowledge and how it is processed is dependent on the individual and his ability to communicate this information. In certain situations, it was found that the recalled knowledge could be made explicit, but was taught experientially (tacit to tacit) to reinforce learning. When evaluating the trigger response element of tacit knowledge, it was identified as having a tacit to tacit and a tacit to explicit element. There was no control over the recalled information and the form it was recalled in.

As knowledge was being identified and reflected upon, (Moon, 2000), further layers of knowledge were identified and through further reflection the process was repeated and more tacit knowledge was brought to the forefront. This process could also be observed with a triggered response. As a layer of knowledge was triggered and reflected upon, a further layer could be identified, which in turn could unlock the next layer through reflective process. In certain circumstances this could be repeated three or four times and in others it could be a one off-process.

In developing the tacit knowledge spectrum model, the elements of tacit knowledge can be easily displayed and the associated implication of tacit knowledge transfer can be identified. Transferring tacit knowledge into explicit knowledge is not a straight forward process and being able to target and implement appropriate methodology to deal with specific elements of tacit knowledge will facilitate the knowledge transfer process.

The Tacit Knowledge Spectrum

In order to start constructing a tacit knowledge spectrum we have to go back to the early writings of Polanyi (1966) and his book *The Tacit Dimension*. Here Polanyi outlined the concept of tacit and explicit knowledge in that “we can know more than we can tell”. Polanyi’s concept of knowledge was that tacit and explicit knowledge were not separate categories of knowledge, rather they are integral part of all knowing.

Nonaka and Takeuchi (1995) in their book *The Knowledge Creating Company* take forward the work of Polanyi and separate tacit and explicit knowledge. This can be seen in table 1 (Two Types of Knowledge, p.27). Nonaka and Takeuchi through the assumption that knowledge is created through the interaction of tacit and explicit knowledge, postulate four different modes of knowledge conversion which can be seen in figure 2. (The Seci Model, p.32). Nonaka and Takeuchi propose a cyclic approach in which tacit knowledge is shared throughout the organization as it moves through the four modes of
knowledge conversion, becoming explicit and evolving into knowledge capital which becomes part of the company culture embedded into the workforce and working practices, again becoming tacit.

In order to start building a model of the tacit knowledge spectrum, this is the first fundamental question that needs to be addressed. From the analysis of the case studies, it can be seen that a component of tacit knowledge can be identified and isolated. If you apply the theory of Nonaka and Takeuchi you can successfully argue that tacit knowledge can be turned into explicit knowledge which with time evolves into knowledge capital and again becomes tacit.

The fundamental problem with Nonaka and Takeuchi theory is the identification of tacit knowledge. Throughout the cases studies, it could be observed that the identification of tacit knowledge by an individual is problematic; the first layers of tacit knowledge come away relatively easily through reflective practice, but then a trigger is required such as group discussions or a pressure situation before the tacit knowledge is identified. For this reason Nonaka and Takeuchi’s theory is too simplistic; tacit knowledge can not be treated as a single entity which can be transferred in its entirety into explicit knowledge. The components that make up tacit knowledge are far more complex and need to be treated accordingly.

The elements of tacit knowledge and their interrelationship have been analyzed and represented in the form of the tacit knowledge spectrum. The graphical representation of the tacit knowledge spectrum gives an instant visual view of the interrelationship of the tacit elements and the complexity of trying to retrieve the tacit knowledge by the individual (Figure 2).
The Transferring of Tacit Knowledge

From the carrying out of the case studies, it could be observed that when asked to reflect on a process or procedure, a reflective cycle was carried out as suggested by Kolb (1984). As the individual started to process his tacit knowledge, the reflective cycle came into play and further layers of knowledge rose to the surface. This process is represented in a feedback loop in Figure 3.

*Figure 3. The Reflective Process*

Through further investigation and observations, it became apparent that a triggered response reflective cycle was also contributing to the recall of tacit knowledge. As the individual discussed the recalled tacit knowledge in a group or one to one environment, or in a pressure situation such as a breakdown in production, this triggered a further recall of tacit knowledge. This again on reflection could expose further layers of knowledge. This triggered response is represented as a second feedback loop, Figure 4.

*Figure 4. Triggered Response Loop*
Throughout the case studies, recalled tacit knowledge could be identified as two different elements, a tacit element that could be transferred directly to tacit knowledge through experiential learning due to its complexity and an explicit element that could be turned into explicit knowledge, as can be seen in figure 4, the Tacit Knowledge Transfer Model. As these two elements of tacit knowledge are integrated into existing knowledge, a third reflective cycle is carried out. As each reflective cycle is carried out, a deeper layer of tacit knowledge is revealed.

**Conclusion**

With the near collapse of the apprenticeship system (a well tried and tested method of tacit knowledge transfer) and an ageing skilled workforce especially within the engineering sector, the need for organizations to investigate tacit knowledge release is of high importance. The results of the case studies, pointed to tacit knowledge transfer taking place, but by no means was all the tacit knowledge available to the organization transferred. This point was readily agreed upon by the academics, the organization and the employees involved in the case studies.

The current literature on tacit knowledge and its transfer, treats tacit knowledge as a single entity. From the analysis of the case studies, it was found that tacit knowledge can be recalled in different forms: tacit knowledge that could easily be turned into explicit knowledge, tacit knowledge that was easier transferred through experiential learning, tacit knowledge that
only came to the forefront through the aid of a trigger and tacit knowledge that was personal to the individual but not identifiable.

The development of the Tacit Knowledge Spectrum Model represents the elements of tacit knowledge identified within the case studies and their interrelationships. The complexities of tacit knowledge are represented in a graphical format with the four identified elements clearly visible. The aim of the model is also to show that there are different levels of tacit knowledge, levels that can easily be recalled and transferred, to levels that an individual can not identify and may take years to unravel and transfer. The model is not complete, as it is anticipated that through further research and cases studies, more elements will be identified that can be added to the model and the model will be expanded. By fully understanding the complexities of tacit knowledge and the inter-relationship of the elements of tacit knowledge, knowledge transfer and the management of tacit knowledge should become a more successful and a useful resource to organizations.

References


Resource and Feasibility Research on University Students’ Entrepreneurial Activities*

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Abstract

At the Education forum for Asia-Beijing 2004, Mr. Chenyu, the Director of the Chinese Employment Technique Training and Appraisal Center of the Ministry of Human Resources and Social Security of PRC, had pointed out that the entrepreneurial opportunity was numerous in China, but the entrepreneurial ability was lower than that of the world average level. The majority lack entrepreneurial technique and experience in China, so the entrepreneurial ability training has been paid special attention. University students have learned theories systematically and possessed excellent potentials. If they are systematically trained and integrate various entrepreneurial factors and environment resources, they will become the leaders of entrepreneurial teams and then achieve entrepreneurial success. In this paper, the authors demonstrate this argument based on the investigation on university students’ entrepreneurial intention, entrepreneurial ability and entrepreneurial environment of universities in China.

Keywords: University students, entrepreneurial resource, feasibility analysis

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Background

On one hand, the emergence of entrepreneurial activities of Chinese university students comes from the high-speed development of China's economy and Internet's economy, and the trend of the level, diversified social consumption demand promote the large increase of entrepreneurial opportunity. On the other hand, the growing pressure on employment leads university students to be self-employed, which is an important way to solve the problem of university student employment. Therefore, university students become important force of entrepreneurial group in society. Seminar's investigation reveals that, 72.71% of the university students have considered trying entrepreneurial activities, 5.62% of the students have practiced entrepreneurial ability, and 0.91% have already obtained entrepreneurial success. It can be seen from the investigation that the success rate of university students' entrepreneurial activities is not high for various reasons. According to reports of www.people.com in January 2010, the national success rate of university students' entrepreneurial activities is only 3% on average. Even in Zhejiang Province, the success rate is only 4% (which is said to be the highest in China), whereas average success rate of the global university students entrepreneurial activities is 20%. There are some queries of feasible production of university students' entrepreneurial activities, but this does not mean that university students' entrepreneurial activities are infeasible. University students receive systematic theory knowledge of education, so they have some good entrepreneurial potential. If they are developed and trained to enhance their entrepreneurial quality and ability constantly, they will be able to integrate entrepreneurial resources and reduce the entrepreneurial risk, thus obtain entrepreneurial success.

Objectives of the Research

The main issue of this research is whether it is feasible for university students to establish business and what resources should be needed for the entrepreneurial activities. Therefore, this study aims to:
1. analyze the resources and the advantage factors for university students to establish business
2. analyze the key elements for success of university students to establish business
3. call widespread attention to the training of university students' entrepreneurial ability

Theoretical Framework

Timmons’ entrepreneurial model is the conceptual framework of this study, which argues that business opportunity, resource and entrepreneurial team are the important drive factors of entrepreneurial process. The business opportunity is the principal factor for entrepreneurial success, especially at the beginning stage of an enterprise. The amount of resources is relative, and entrepreneurial success which does not seek full ownership of resources is more focused on minimizing the use of resources and control of resources. The entrepreneurial team is the key factor for entrepreneurial success, because the excellent entrepreneurial team often can attract risk investors (Jiang & Zhang, 2005, p.33).

Professor Timmons, of the United States, Babson University, puts forward one of the most influential modes of entrepreneurial process based on the dynamic course (Lu, 2009). Timmons entrepreneurial model argues, “during entrepreneurial process, the task of the entrepreneurial leader and the team is to seek more business opportunities and reasonable application of resources repeatedly, making the whole tripod keep the equilibrium, in which the leader's function is essential” (Jiang & Zhang, 2005, p.31-32). So the entrepreneurial leader that is the subject resource of the entrepreneur becomes a key element of entrepreneurial activities.
Methodology

A survey of 1103 university students on their entrepreneurial quality and ability was conducted by the survey company of Star. The questionnaire covers 20 questions about university students on their entrepreneurial quality and ability in China. Then an interview was conducted in Shijiazhuang, and the interviewees covered students from grade 1 to grade 4. Finally, the investigated information was summarized and classified by using statistical tools, and the correlated analytical results were described in the form of a table.

Results and Discussion

Entrepreneurial activities are the combination of entrepreneurial individuals and business opportunities, and resources that are not the only key elements for entrepreneurial success.

“It is the enterprises, as the economic entity, in the course of offering the products or service to the society on resources, the ones that own or be able to achieve the various elements of corporate strategy and elements of composition” (Jiang & Zhang, 2005, p.28), particularly it is various inputs in the organization, including the manpower, financial resources and material resources. Entrepreneurial resources are essential for the new growing business start-ups. According to controllability of new resources, resources can be divided into subject resources and objects resources. Subject resources mean that which can be accessible through the training and development, such as entrepreneur, enterprising spirit, personality, entrepreneurial knowledge, entrepreneurial ability, entrepreneurial awareness, etc; Object resources refer to the entrepreneur’s uncontrollable objective resources, which can be obtained
through the society and other people, such as the policy, field, fund, education, information, etc. Resources are the important influence factors of entrepreneurial success.

**Subjective Resources for University Students to Establish Business**

Seminar about "University students' entrepreneurial quality and ability" reveals that, in 1103 valid questionnaires, university students thought that the main obstacles of entrepreneurial activities ranked the first three (many selected titles): insufficient funds 900 people, lack of entrepreneurial experience 836 people, less social relationships 731 people, accounting for 81.60%, 75.79%, 66.27% separately; The ones that ranked the last three are other 54 people, a lack of entrepreneurial spirit 306 persons, lack of entrepreneurial personality traits 342 people, accounting for 4.90%, 27.74%, 31.01% separately (as shown in Table 1).

### Table 1

*University Students' Entrepreneurial Obstacle State*

<table>
<thead>
<tr>
<th>Items of Entrepreneurial Obstacle</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient funds</td>
<td>900</td>
<td>81.60%</td>
</tr>
<tr>
<td>Lack of entrepreneurial experience</td>
<td>836</td>
<td>75.79%</td>
</tr>
<tr>
<td>Lack of social relations</td>
<td>731</td>
<td>66.27%</td>
</tr>
<tr>
<td>Not good at grasping the entrepreneurial opportunity</td>
<td>518</td>
<td>46.96%</td>
</tr>
<tr>
<td>Lack of entrepreneurial knowledge</td>
<td>514</td>
<td>46.60%</td>
</tr>
<tr>
<td>Lack of business direction</td>
<td>459</td>
<td>41.61%</td>
</tr>
<tr>
<td>Lack of entrepreneurial skills</td>
<td>389</td>
<td>35.27%</td>
</tr>
<tr>
<td>Lack of entrepreneurial personality</td>
<td>342</td>
<td>31.01%</td>
</tr>
<tr>
<td>Lack of innovation</td>
<td>306</td>
<td>27.74%</td>
</tr>
<tr>
<td>Others</td>
<td>54</td>
<td>4.90%</td>
</tr>
</tbody>
</table>

Valid sample size 1103


Seminar on the interview of university students' entrepreneurial quality and ability reveals that, 60.00% of the students have communication and coordination ability, 43.33% of the students have the ability to organize and plan, 40.00% of the students have the group's managerial ability, 60.00% of the students have the quality of honest sincerity, 56.67% of the students have sense of mission and sense of responsibility, and 56.66% of the students have firm and indomitable character. The economics research indicates that individual endowment to some extent affects the way of rational decision-making and results, showing that the individual based on its endowment copes with external uncertainty and seeks the behavioral result that incomes maximize in the rational choice process. Entrepreneurship is an opportunity-driven process, lacking of sources and a behavior process containing a lot of uncertainty. In case of having inadequate experience, shortage of funding, the graduate is not penniless while the individual endowment is its entrepreneurial resource foundation before the start (Hu & Chen, 2008).

University students have accepted systematic higher education, full of passion, relatively abundant knowledge reserves, have strong entrepreneurial hope and good entrepreneurial potential, have basically possessed the key entrepreneurial element, through training, can well become the entrepreneurial leader, and integrate entrepreneurial resources rationally, so the entrepreneurial success can be achieved.
Objective Resources for University Students to Establish Business

For the time being, in China, university students’ entrepreneurial object resource is staying in the best period in history. There are a large number of preferential policies from national to local levels of government related departments, setting up venture capital funds, business incubator, business forum organized by University students, etc, which provide feasibility of environmental resources for University students to succeed in business.

Policy resources.

Chinese government has introduced many policies to support University students to start business since the development of pioneering education in the University in 2002, forming a set of employment policy system which consists of 15 matching documents for graduates. (Ministry of Human resources and Social Security of China, 2009).

From the national level, the Chinese Communist Youth League Central Committee, the National Youth Federation and the National Federation of Industry Launch jointly initiated, started YBC Youth Business China International projects for young people 18-35 years old and provided services and guidance; the Ministry of Human Resources and Social Security of China on the implementation of 2010 employment of college graduates promotes the employment of college graduates and introduce them to lead in business plan, that provides the required conditions for entrepreneurship in which students can enjoy a registered capital of concessions, small secured loans, tax relief and other support policies. Trainee graduate entrepreneurship will be included in job attachment, and implement integrated management, encourage and support university graduates to engage in entrepreneurial practice offering online shop and provide business counseling and facilities. (Ministry of Human resources and Social Security of China, 2010).

On May 4, 2010, the Ministry of Education in view of the vigorous promotion of innovation of entrepreneurship education in colleges noted that at the intact college graduates, in accordance with industry characteristics and a reasonable set of funds, personal and others were allowed to pay for registered capital in stages. In accordance with the laws and regulations of the conditions, procedures and contract, college students are allowed to make family home, rental housing, commercial buildings and other temporary premises as venues for business (Ministry of Education of China, 2010).

From the local level, 27 provinces in China have college students’ business incentives. It can be roughly summarized as financial services, site support, business guidance, tax relief, capacity building, and information provision. University graduate entrepreneurs in Shanghai can enjoy the free risk assessment, policy training for free, free loan guarantees and tax relief for some of the four incentives. Students in Beijing and Hebei have started to enjoy free administrative charges, small secured loans and preferential policies on vocational training; entrepreneurial college graduates in Guizhou can try business before re-accreditation.

Site resources.

Site resource is one of the first conditions of survival. Chinese government at all levels and universities establish a large number of innovation parks and business incubators and provide policy related supports to build business support platform for students.

Together with the Science and Technology Ministry, Education Ministry of China has established 69 national graduate entrepreneurship and technology parks in universities (Ministry of Education of China, 2009), and relies on the parks, made main focus on building a number of "college students practice base technology start-ups", and formulated relevant measures. In 2001, China’s first
The large number of preferential policies on the venue rental and capital subsidies, reduction of costs of business parks and incubators effectively address students entrepreneurial venues.

**Financial resources.**

Adequate funding will accelerate the development of new enterprises. Chinese government at all levels, universities and various community organizations create a variety of financing channels to provide financial resources for graduate entrepreneurship.

Communist Youth League Committee of Fujian Province with the Personnel Department, Ministry of Finance and other departments set up the initial size of 5 million yuan of the “guarantee fund for University Students owned businesses in Fujian” and provide specifically finance services for remote start of college graduates applying for small loans; financial institutions in Fujian launch a youth entrepreneurship exclusive card “Youth Card” as the project platform for students and college graduates who have entrepreneurial demands. (Communist Youth League Committee of Fujian Province, 2009)

In 2009, Communist Youth League Beijing Municipal Committee established Beijing’s first venture fund for young people, and the start scale was not less than 400 million. Beijing improved small secured loan for entrepreneurs and the maximum loan was up to 500000 in April 1, 2009 (Bureau of Human Resources and Social Security of Beijing, 2009).

From 2009, Hunan Provincial Government annually sets up special support fund of 50 million Yuan to support students to innovate and go entrepreneurial, and the fund appropriation increases every year; Hunan Science and Technology plans to introduce special funds for additional innovative and pioneering students and to support college graduates technological innovation and entrepreneurship within the province (Hunan Provincial Government, 2009)

In Jiangxi Province, the small secured loan finance discount fund management approach”provides that discount credit line is up to 200 million and financial grant, full or half discount, in case of which college graduates engage in commercial, industrial catering, self-repair and other items in the community, (Jiangxi Provincial Department of Finance, 2009)

**Information resources.**

Information resources are the basis for start-ups in making scientific decision. The Chinese government at all levels and social organizations make full use of modern information technology to provide venture projects to business students and guide the students to strengthen information awareness, such as set up students to start a project library, organize display of the project; promote and guide business activities, organize business forum, establish business students club, sorority and other forms of entrepreneurial business platforms for college students. In September 27,2004, the of University Students Business Network was established. Close to the end of 2009,25, provinces and cities in China established a union site and launched a network of UK business students and Spanish business network.

**Educational resources.**

Students pioneer park at all levels throughout China and the China Youth Career international programs YBC offer business tutorial services to university students and organize a group of socially responsible entrepreneurs and business professionals to mentor students from the business sector mentor group, expert voluntary groups provide guidance services to students with an entrepreneurial bent, guide
students to develop business plans, program business road map for the students and implement business education and entrepreneurship training.

YBC gathers more than 3000 volunteer tutors, provides 280 professional trainings for 6 years, tutors itinerant teach 280 times and provides 40000 hours of service for the start to young people. According to YBC statistics, as of November 2009, the survival rate of young start-ups YBC supported up to 97%, repayment rate on time up to 88%, 74% of corporate profits rate, more than 10,000 new jobs, turnovers reached more than 700 million Yuan, tax payment of 700 million, attracting investment of more than 2,000 Yuan (Youth Business China [YBC], 2009).

College students are one of the most innovative and entrepreneurial potential groups. Since Tsinghua University took the lead in organizing the Business Plan Competition in 1998, the current Business Plan Competition, a business competition carried out extensively in China, and its provinces and municipalities, in all levels of government, and social media paid great attention and vigorous propaganda, to form strong entrepreneurial students social atmosphere, while providing a great deal of support for policies and measures on site resources, financial resources, information resources, educational resources. Therefore, the business environment is becoming increasingly mature.

Conclusion

Entrepreneurship is the expander of social employment. College Students as China’s high-quality talent, have a higher quality of professional culture, the unique spirit of innovation and the relative age advantage that young people own, so they are not only the competitors of existing jobs, but also the creators of new jobs.

Entrepreneurship spirit and entrepreneurship ability are scarce resources. As long as society and universities educate and train college students in a planned and purposeful system, develop sustainable development of entrepreneurship spirit and entrepreneurship ability, and then select the appropriate start time (usually graduate 3-5 years), coupled with good business environment resources, college students can complete a successful venture.

Recommendation

Much attention should be paid to training Chinese university students of their Entrepreneurship Spirit and Entrepreneurship ability, which can be achieved through systematic educational courses and practical activities.

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Semantic Multimedia in Engineering Education: Towards Creating a Knowledge-driven Framework

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Abstract

The application of semantics to multimedia is motivated by the impressive growth of online repositories of Engineering Education objects. 3D models and virtual spaces enhance the interaction capability of the students and researchers within virtual labs and courses. In this paper, we discussed issue related to the definition of semantic 3D media, taking into account the perspective of the 3D application requirements with a special view on the multi-layer organization of 3D content, different levels of abstraction and understanding related to knowledge domain in Engineering Education. Many disciplines now develop standardized ontologies that domain experts can use to share and annotate information in their field of studies. The ontology defines common vocabulary for end-users including machine-interpretable definitions of basic concepts in the domain and relations among them. Here we present ontologies used for the representation of 3D content structure in Engineering Education. Our example refers to a virtual representation of an ancient bronze axe, structure of a multimedia document itself, depending on the type of document and the relations between different structural elements. How effective 3D content can be in enhancing teaching and learning remains to be seen. In this respect, surveys should be carried out on the efficiency of such approach in education.

Keywords: Semantic multimedia, knowledge domains, ontology, 3D objects, engineering education
Background

Currently, in our education systems and especially in the engineering education, one faces many deficiencies as concerns the digital learning environments with regard to concepts, consistency, screen layout, interface design, navigation strategies, low-level of multimedia based interactions. The communication capabilities in a learning environment can be enlarged by design of multimedia systems focusing on the learner’s benefit. The learning system should be provided with sufficient visualization of multidisciplinary contents for engineering educational activities, especially by 3D models, 3D animations and simulations, which facilitate the learner's immersion in a hidden world (Klett, 2001).

The coding of additional knowledge in the form of structured metadata is important for the development of learning environments that take into account not only the geometry of shapes but also their semantics or meaning. At the same time, structural decompositions allow to consider a shape not only as a whole, but also as the collection of its parts.

Many disciplines now develop standardized ontologies that domain experts can use to share and annotate information in their fields and to transpose them into virtual environments.

What is an ontology? – A short answer as it has been given by Gruber (1995) could be: “An ontology is a specification of a conceptualization”. In the context of knowledge sharing, the term ontology is a description (like a formal specification of a program) of the concepts and relationships that can exist for an agent or a community of agents. What is important is what an ontology is for. Ontologies have been designed for the purpose of enabling knowledge sharing and reuse. In that context, an ontology is a specification used for making ontological commitments. Practically, an ontological commitment is an agreement to use a vocabulary (i.e., ask queries and make assertions) in a way that is consistent (but not complete) with respect to the theory specified by an ontology. We build agents who commit to ontologies. We design ontologies so we can share knowledge with and among these agents (Gruber, 1995).

When ontologies are used for media description and generally for the description of an information object, a clear distinction between annotations describing the information object and those concerning the multimedia document’s content (e.g. semantic concepts depicted in an image) needs to be drawn. Furthermore, the ontologies need to describe and represent knowledge for either one or more of the following top-level hierarchical types of multimedia documents: image, video, 3D graphics, audio, and audiovisual (Spagnuolo, Falcidieno, 2008).

Semantic multimedia, as the evolution of traditional multimedia, allows the use and share content of multiple forms, endowed with some kind of intelligence, that is accessible in digital form and in distributed or networked environments. The success of semantic multimedia largely depends on the extent to which we will be able to compose them, and the related processing tools in systems that provide efficient and effective search capabilities, analysis mechanisms, and intuitive reuse and creation facilities, at the level of content, semantics, and context (Golshani, 2006). For textual documents, retrieval services attacking the data grave problem are widely available, but what is the analogue of full text search in a repository of 3D content?

At present, several research projects are focused on the issue of the content-based information attached to 3D data generated by 3D scanning (achieved by scanner devices), photogrammetry (reconstruction of 3D data from 2D images) and procedural/parametric shape design (creation of new shapes from existing similar, parameterized shapes). Due to the nature of the data type and complexities involved in acquisition, production and processing of 3D data, a number of serious issues exist regarding 3D data acquisition, representation, encoding, content mark-up, and data history management. To date, these problems have not been sufficiently solved, and represent a major obstacle to a full integration of the 3D data type into digital archives. Significant results have been achieved by the Princeton Shape Benchmark (Shilane et.al, 2004), which supports searching by geometric similarity, starting from queries defined by sketching or by example.
In this paper we will discuss the perspective of a formal organization of 3D models enriched with metadata that make it possible to search for content also in terms of knowledge about the 3D shapes. Such shapes can be introduced into the didactic materials of the engineering education. Hereby we will refer to an example of shape annotation that has been integrated in the framework provided by the AIM@SHAPE Project. Our contribution is focused on the modeling a best-suited ontology in order to retrieve those parts of the shape that has significance for students and researchers when analyzing such tools.

**Research Problem**

Digital environments of engineering education requires virtual representation of 3D objects as a whole and as component parts. Representation of the provenance and processing of 3D digital objects needs to cover the initial data capture, the format and encoding of the individual elements and any refinements or abstractions that have been applied, documenting in each case the circumstances of the processing applied. Specific topics that have to be covered are: development of a standard for describing the sources of digital 3D; development of a standard way of recording how the source data have been processed and how they were combined to obtain the result. Finding multimedia objects by their content in a distributed database means searching them on the base of content descriptions and similarity features.

**Objectives of the Study**

Here we discuss ontologies used for the representation of 3D content structure with special view to the representation of tools. The discussion refers to the structure of a multimedia document itself, depending on the type of document and the relations between different structural elements.

The developed multimedia ontology serves the following reasons:
1. Annotation (labeling or tagging of multimedia content);
2. Analysis (ontology-driven semantic analysis of multimedia content);
3. Retrieval (context-based retrieval of images, 3D objects or video from large archives);
4. Personalization (filtering and recommendation of multimedia content according to user preferences and needs);
5. Algorithms and processes control (ontologies used to model multimedia processes and procedures);
6. Reasoning (applied in retrieval and personalization for creating autonomous content applications).

**Theoretical Framework**

Metadata have a relevant role in this context, representing the value-added information that describes the administrative, descriptive, preservation and technical characteristics associated with the multimedia resources. Metadata information can be automatically or manually extracted from multimedia documents (video, audio, audio-visual documents) by considering the annotations. Due to the high cost and subjectivity associated with human-generated metadata, a large number of research initiatives are focusing on technologies to enable automatic classification and segmentation of digital resources (e.g., automatic generation of metadata for textual documents, images, audio and video resources). Several consortia are working on a number of projects in order to define new metadata standards. One of the more recent approaches is to combine a specific multimedia metadata standard with other standards useful to describe other application domains, in order to have a more complete characterization of the specific problem without creating a new standard. New metadata initiatives such as, MPEG-21, NewsML, and
several communities (museums, business and engineering education, medicine and others) want to combine MPEG-7 multimedia descriptions with new and existing metadata standards for simple resource discovery such as Dublin Core to satisfy their domain-specific requirements. In order to do this, it is necessary to have a common understanding of the semantic relationships between metadata terms from different domains. To this purpose, Extensible Markup language (XML) schema provides support for expressing semantic knowledge and Resource Description Framework (RDF schema) provide the bases for such approach.

In our example, we have developed the ontology for the description of an axe tool. Terminology and definitions for the foundations of geometric modeling were introduced by Requicha in 1980. The Requicha’s paradigm uses four levels of abstraction, called universes and expresses the modeling pipeline as transitions or mappings, between these universes.

In order to handle semantic 3D media, a new modeling paradigm has been proposed (Spagnuolo & Falcidieno, 2008). This paradigm differs from Requicha’s scheme in two ways: the coexistence of a real universe coupled with a semantic one and the formalization of the mathematical universe whose models are based not only on purely geometric aspects but also on a set of multiple views or structures, on top of the geometry as one can see in Figure 1.

**Figure 1.** The semantics-based modeling paradigm for 3D media (Spagnuolo & Falcidieno, 2008).

The universe of objects to be modeled has to be coupled with a *knowledge domain*, or conceptual world. In this universe, one can find abstractions of the human perception, understanding, and organization of 3D media content and related knowledge.

Entities belonging to a conceptual world are concepts of *similarity*, *features*, *structural decompositions*, or *shape categories*.

Shapes are characterized by *geometry* (i.e. the spatial extent of the object), they can be described by *structures* (e.g. form features or part–whole decomposition), they have *attributes* (e.g. colours, textures, or names attached to an object, its parts, and/or its features), they have a *semantics* (e.g. meaning, purpose, functionality), and they may also have interaction with *time* (e.g. history, shape
morphing, animation) (Falcidieno et. al., 2004). In this paradigm, the key issue to focus on is the structural level of representation of shape models.

Up to now, the few ontologies describing 3D media usually refer to partial aspects of the shape geometry, considering only the representation used for a specific application. In order to implement a 3D semantic application, a conceptualization of the shape itself, in terms of geometry, structure and semantics, and of the knowledge pertaining to the application domain is needed. The fulfillment of such requirements in complex 3D applications implies research oriented towards the development of tools and methods to formalize and manage knowledge related to the media content and to the application domain. Levels that should be addressed have been stated as follows:

- **Knowledge related to the geometry of 3D media:** while the descriptions of a digital 3D item can vary according to the contexts, the geometry of the object remains the same and it is captured by a set of geometric and topological data that define the digital shape;
- **Knowledge related to the application domain in which 3D media are manipulated:** the application domain casts its rules on the way the 3D shape should be represented, processed, and interpreted. A big role is played by knowledge of the domain experts which is used to manipulate the digital model: for example, the correct manner to compute a finite element mesh of a 3D object represented by free-form surfaces is subject also to informal rules that should be captured in a knowledge formalization framework;
- **Knowledge related to the meaning of the object represented by 3D media:** 3D media may represent objects that belong to a category of shapes, and in broad unrestricted domains. The shape categories can also be described or defined by domain-specific features that are the key entities to describe the media content, and these are obviously dependent on the domain (Spagnuolo & Falcidieno, 2008).

The goal is a complete semantic 3D-model instead of projections in lower dimensions (image, section, animation, text) or collections of polygons without structure. A deep integration of 3D into digital libraries and collection management systems is required. Before one can represent the semantic content of the 3D objects and assemblies of objects it has to define the vocabularies, taxonomies and ontologies that express the semantics and represent them.

**Methodology**

In this section we will present an example of ontology developed in Protégé 3.4 software. The procedure starts with the achievement of a semantic description of the ancient tool and further on continues with the annotation achieved on the model, based on the mentioned ontology.

Axes are tools considered as the height of the technology of the Bronze Age, widely spread all over Europe. The body of the tool is hollow so that it can receive a shaped projection at the end of the haft in order to secure the haft to the metal axehead (Figure 2.).
Figure 2. Bronze axe discovered in Transylvania, Romania
Discussion

Based on the classifications and information provided in the literature (Eogan, 2000) we have developed an ontology of the ancient tool, which will be used for the segmentation of the model and further to its virtual representation.

At the conceptual level, an ontology is defined by the specification of classes, with their attributes and properties that may also define relations between the classes. This formal framework is used to produce a so-called knowledge base (Figure 6.), which may be regarded as the ontology, plus a repository of resources that belong to the classes defined by the ontology itself. Such resources are called individuals or instances. Thus, describing an object in a knowledge domain means to create an instance of a class with proper attributes and relations, given an ontology that conceptualizes that domain. In the context of this paper, we are targeting the use of ontologies, which describe the characteristics of relevant shape features and their possible relations. The annotated shape is represented by two files: the first contains the geometry with a face-index coding of the segmentation, and the second contains the semantics of the segmentation, that is, the correspondence between segment identifiers and concepts in the ontology.

The purpose of annotation is to create correspondences between objects, or segments, and conceptual tags. Once the object and/or its parts are annotated, they can easily match textual searches or advanced and semantics-based annotation mechanisms support content-based and part-based retrieval within the framework of standard textual search engines. Having an ontology that describes a given class of shapes, the optimal solution for annotating 3D models would be to use a shape segmentation algorithm able to automatically detect all the features conceptualized by the ontology. This approach is far from being feasible at present, as existing segmentation algorithms hardly target semantic features and usually address more geometry-oriented features (Attene et al., 2007).

In the ontology-driven annotation, the tags are defined by the ontology. Since the conceptualization is shared, there is no freedom in the selection of tag names but this means a common understanding of the given tags eligible for selection. Thus, the coupling of segmentation and knowledge formalization could foster the development of totally new approaches to shape retrieval. For example, we could be able to answer queries of the type “find a shape containing a loop and socketed body” or more specifically to refer directly to subparts, e.g. “find a socketed axe with rectangular mouth”, or “rope moulding around the mouth” obtaining as results proper subparts of shapes.

Semantics can be associated to the content itself, thus providing an enriched representation of the content. Expressing the semantics of 3D shapes requires: the identification of significant parts (features); the specification of the semantics using some kind of formalism; and finally the storage of the geometry plus its semantic description in a way that could be accessed easily by humans as well as by software agents.
Figure 3. AxeOntology developed in Protégé
In this example, we discuss the annotation pipeline and the graphical tool proposed by the ShapeAnnotator. After loading the model and the ontology, the first step of the annotation pipeline is the execution of segmentation algorithms to build the multi-segmented mesh. Once done, from the resulting multi-segmented mesh, interesting features can be easily selected by simple mouse-clicks (Figure 5). Each interesting feature can then be annotated by creating an instance of a concept described in the ontology. The ShapeAnnotator environment provides solutions such as: (1) A multi-segmentation framework that makes it possible to specify complex and heterogeneous surface features; (2) An advanced annotation framework that enables the user to transform his knowledge into a formal digital content; and (3) A specific coding of the knowledge, based on standardized languages, representing a concrete bridge between geometry and semantics (Attene, 2007).

The result of the annotation process is a set of instances that together with the domain ontology, form a knowledge base (Figure 6).
Figure 5. Segmentation and annotation of the axe based on the developed AxeOntology
Figure 6. Instances with specific relations representing a bridge between the geometry and semantics

All instances produced during the annotation pipeline are automatically assigned values for the above properties, so that the link between semantics and geometry is maintained within the resulting knowledge base (Figure 6). A fragment of the file *AxeOntology.owl* storing the ontology used in Figure 6 is presented in Figure 7.
Conclusion

Further investigations and research will be carried out on the design and implementation of a knowledge-based system for engineering education. Our first target is to create a digital framework for virtual teaching of Materials Science Engineering. The efforts will focus on the use of integrated spatial
and thematic ontology to address problems related to the search and retrieval of 3D objects that can be introduced into the digital materials for courses and laboratories.

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IT based Knowledge Management

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Abstract

Knowledge Management can be seen from various perspectives: From Artificial Intelligence we can learn how knowledge can be presented in a formal way as a basis for knowledge processing. Information Technology in general has provided several approaches to support and improve a successful knowledge management in an organisation. The paper first clarifies the notions knowledge and knowledge management and reviews various techniques for knowledge representation: text, picture, logic formulas, rules or networks. The relationships between knowledge processing and knowledge management will be outlined. Knowledge networks or topic maps will be highlighted knowledge networks enable a semantic search for knowledge. Unlike common search engine a semantic search considers the relationships between the search term and other notions. The overview on information technology based knowledge management will include wiki systems as well. So called semantic wiki systems allow a semi-formal knowledge representation. The paper argues that knowledge management should be an integrated part of any engineering or business degree program. Graduates should not only be able to use knowledge management systems but should be the driving force in implementing such systems. Moreover knowledge management is not a theoretical issue only, applied knowledge management is used for co-operative learning.

Keywords: knowledge management, knowledge processing, knowledge in engineering and business education, higher education,
Background

Knowledge is not only a buzzword related to knowledge management or knowledge society but it is a widely used notion in everyday life as well as in academic life.

- But what is knowledge?
- What is knowledge management?
- How can information technology support our handling of knowledge?

The paper discusses these questions. Although our society has become a knowledge society the notion knowledge is rarely discussed in degree programmes. We start taking a closer look onto the term knowledge. Based on a definition or explanation of knowledge, various kinds of knowledge representations are presented. A formal knowledge representation opens the door for (an automated) knowledge processing as this is in the focus of artificial intelligence. Knowledge management has been in the focus of business administration for many years. Knowledge has become a productivity factor and a working knowledge management can put an organisation into a comfortable position within the global competition: If you know what to do, your decisions will be the right ones. Information technology has provided methods and tools for the management of knowledge since the very beginning. Thus, we look at techniques which have been used for knowledge management for a long time and introduce some new developments like knowledge networks or wiki systems. Wiki Systems have become well known since the launch of wikipedia. It is argued that extended wiki systems, so called semantic wiki systems, will become powerful knowledge management systems within the next few years.

Finally we look at the degree programmes at the Wismar Business School and the Faculty of Engineering at Hochschule Wismar and discuss the role of knowledge and knowledge management in the degree programmes offered by the faculties. As a result it will be recommended to include knowledge management as a topic into any academic education in order to prepare our graduates for their future in a knowledge society.

Discussion

Good to Know: Knowledge

Everybody has to apply his or her knowledge almost every minute day in and day out. Especially in education knowledge is a widely used word. We say that students have to show their knowledge in oral or written exams. But what is knowledge? The Illustrated Oxford Dictionary (1998) gives several explanations:

“1 a (usu. fool. by of) awareness or familiarity gained by experience (of a person, fact, or thing) (Have no knowledge of that). b a person’s range of information (is not within his knowledge). 2 a (usu. foll. by of) a theoretical or practical understanding of a subject, language, etc. (has a good knowledge of Greek). b the sum of what is known (every branch of knowledge). 3 Philos. true, justified belief; certain understanding, as opposed to opinion.”

The second and third points are of special interest: the second explanation of the term knowledge is the one education deals with. During their studies, students extend their knowledge (theoretical or practical) of various topics. The third point is related to logic. Knowledge is more than an opinion, it can be proofed or at least justified and therefore knowledge is always true: If we know something then we act according to that knowledge. Naturally knowledge can change due to new information. This does not
imply that the knowledge itself becomes false. Instead the knowledge has extended including the fact that the former information cannot be applied any more.

Davenport and Prusak (1998) characterize knowledge as “information combined with experience, context, interpretation, and reflection. It is a high-value form of information that is ready to apply to decisions and actions” and therefore underlines as well that knowledge is something we can apply.

From the computer science perspective or the informatics perspective, knowledge is based on information, information is based on data, and data is based on a message, see figure 1. A message is build by a sequence of signals. (So far no other ways of sending and receiving messages are known.) A message is physical: If the sequence of signals follow some rules (a structure, a so called syntax) then the message carries data. In informatics we mostly use digital characters carried by some physical message that might be optical (from CD; DVD) or electromagnetic (from chips, disks). Other messages (written text, photographs, sound) can be transformed into digital characters as well.

Figure 1. From a message to knowledge.


A data like 1,230 is only a data, in this case a number and it is not yet information. In Informatics we speak about information if the data and its meaning for the receiver are known: If we know that 1,230 is a daily turnover in Euro then we have some information. We view on knowledge as applied information, i.e. information becomes knowledge if we can apply the information. Application can be performed by a human being or even by a machine.

Knowledge Management can be best motivated and explained by the statement: “If only X knew what X knows”.

Looking into the literature and especially into the internet many values for X can be found, like Siemens, HP, we, your company, you. The aim of knowledge management is to make knowledge available whenever and wherever it is needed. This is the more technical background. In the field of business administration knowledge management is defined as a concept for the development of an organisation:

“Knowledge management is a formal, structured initiative to improve the creation, distribution, or use of knowledge in an organization.” It “is a formal process of turning corporate knowledge into corporate value”, Davenport and Prusak (1998).
Since knowledge management has become a buzzword it is also characterized as “an umbrella term for making more efficient use of the human knowledge that exists within an organization. Knowledge management is the 21st century equivalent of information management” (Illustrated Oxford Dictionary, 1998). A working knowledge management makes organisations more effective and efficient and helps an organisation to survive in the global competition.

Knowledge Representation

In order to be able to share knowledge a representation of knowledge is required. Especially in education knowledge always has been put down in text or pictures. Although computer started as number crunchers the processing of text and later on of pictures has become widely used. Knowledge is stored in a computer as text or picture, see figure 2. The article itself is stored knowledge: at least for those who can read and understand the text. We call it a formal knowledge representation if a machine can apply the knowledge, e.g. can handle the knowledge or “understand” it.

*Figure 2:* Pictures can represent knowledge.

![Figure 2](source: Retrieved July 2, 2009 from quarksteilchen.deviantart.com/art/IKEA-Gehstakk-71351744)

Texts and pictures are not formal representations of knowledge in the sense a computer can handle. Artificial intelligence has focussed on a formal representation of knowledge since formal knowledge representation is the basis for any knowledge processing. Techniques like formal logic or semantic networks are used and will be discussed later.
If someone needs knowledge in order to solve a problem he or she has to assimilate the knowledge provided by someone else either in a direct conversation or via a certain representation. Even in a direct communication knowledge will be represented: an oral representation of knowledge sometimes based on a written representation. Even this article is a representation of knowledge. Knowledge can be represented in different ways and the kind of representation should meet the capabilities of the receiver. For a human being informal knowledge representation is often the better alternative although informal representation could lead to misunderstanding or ambiguities. Vice versa a formal knowledge representation can avoid ambiguities but may be more complicated. A formal presentation of knowledge goes far behind an ordinary text. A formal knowledge representation has to express knowledge in such a way that even a computer can work with it, that the computer can “understand” the knowledge. Taking the definition of knowledge into account the computer has to be able to apply the knowledge.

In the area of artificial intelligence several approaches for a formal representation of knowledge have been developed including various types of logic, an object oriented style called frames, or different types of semantic networks. All these approaches use an explicit knowledge representation, whereas self learning systems like artificial neural network store their knowledge implicitly: Artificial neural networks learn by example but unfortunately it can not be explained why an artificial neural network acts in a certain way.

Here we focus on two explicit and formal knowledge representations. Both are commonly used in real world applications:
- Rules, especially business rules
- Semantic networks, nowadays called knowledge networks

### Business Rules

Knowledge can be represented in a formal way by using if—then statements, so called rules: IF the turnover of a customer is more than 1,000 THEN he is a good customer.

A rule is a special logical formula of the predicate calculus where all the variables are universal quantified and the formula does not contain an existential quantification. In formal logic the example will be written as follows:

\[ \forall x \forall y \text{turnover}(x,y) \land (y>1,000) \rightarrow \text{is_good_customer}(x) \]
\[ \forall x \forall y \text{head}(x) \land \text{deputy}(x,y) \land \text{absent}(x) \rightarrow \text{signs_documents}(y) \]

The second formula expresses the knowledge that if the head is not available and there is a deputy then the deputy will sign the documents. In simplified rule notation it is written as:

IF head(X) AND deputy(X,Y) AND absent(x) THEN signs_documents(Y).

Based on the formal knowledge representation and based on some facts about the head, the deputy, and the absence it can be automatically concluded who will sign the documents. Figure 3 shows another example where the rule is a very general one but is sufficient to solve simple container transhipment problems.
The Business Rules concept uses rules as the formal knowledge representation and applies it to business problems like e.g. business logic or customer relationship management. Business Rules Management Systems (BRMS) can handle large rule bases and offer more flexible solutions than other business software: If changes are necessary due to market developments or new regulations only the knowledge expressed in a set of rules has to be changed or extended. No changes in the software itself are necessary.

**Semantic Networks**

Another rather old technique represents knowledge as a network so called semantic network. From a mathematical point of view it is a graph consisting of nodes and edges. The nodes are entities or concepts and the edges represent relationships between the nodes. A concept hierarchy is a special type of semantic network which has been widely used in artificial intelligence. The hierarchy is built by concept nodes and two relationships: “is a” defines a subset relationship and “instance of” defines a membership. Additional information can be expressed by attribute nodes whereas the edges define the semantics of those attributes. Figure 4 defines the knowledge about German enterprises in a concept hierarchy. The area at the bottom right demonstrates that the Siemens AG inherits the property “enterprise will be taxed”. Thus again knowledge can be processed and new knowledge can be concluded from a defined one.
Figure 4. Knowledge about types of German enterprises described by a semantic network.

IT based Knowledge Management

As expressed earlier knowledge management is an important factor for an organisation. An efficient knowledge management can save a lot of working time. Working time which otherwise had to be spent searching for knowledge or has been wasted for doing things twice. The bigger an organization the more important, IT becomes in having an efficient knowledge management. But Smaller and Medium sized Enterprises (SME) need knowledge management as well: Experiences made in projects as well as business knowledge have to be shared among changing staff members.

Obviously information technology can not guarantee an efficient knowledge management since experiences and knowledge has to be provided by human beings. Information technology can help the employees or may even encourage them to express and therefore share their knowledge. How can information technology achieve this? In recent years several techniques have been developed. We will review the knowledge network approach which is strongly related to the term topic map. Afterwards the wiki approach will be discussed as another possibility to get or to share knowledge.

Knowledge Networks

Knowledge networks are based on the semantic networks concept: nodes represent items or concepts and edges define relationships between the concepts. Moreover a node is not only a single term but an object oriented description of that concept.

Knowledge networks allow a semantic search. Google or similar search engines only find pages which definitely contain the search word – syntactic search. A semantic search offers even results not containing the search word but which are nevertheless strongly related to the search word.

A knowledge network of ThyssenKrupp contains information about the more than 900 companies of the TyssenKrupp group, see Figure 5. The knowledge network was developed by the German company
intelligent views GmbH using their software K-Infinity. A graphical editor is used for the development of a network, see Figure 6.

**Figure 5.** Knowledge network of the ThyssenKrupp enterprise.

We used the K-Infinity software and developed two small knowledge networks:

- The degree programmes in Business Informatics (Bachelor and Master)
- The administration of the university

The work was done within the project TOMAHS –TOpic MAps for Hochschul (university) - Structures (Lämmel, Cleve & Greve, 2005). The knowledge network for the business informatics degree programmes consist of about 400 nodes: modules, lecturers, subjects etc. For every node an accompanying web page was developed which contains further information, mainly text, about the node’s topic.
The TOMAHS project has shown the following results:

- A topic map is a powerful tool to share knowledge by showing the relationship between notions. Required knowledge can be found very fast.
- The development of a knowledge network as a backbone of the topic map requires a lot of manpower and is by no means an easy task.
- A knowledge engineer is necessary to collect the knowledge and transform it into the formal representation.
- It is almost impossible that all the staff members take an active part in the network development process, since an understanding of informatics is required.

Sometimes the notions knowledge network, topic map, and ontology are used as synonyms. We see a topic map which is a graphical representation of a knowledge network: The distance between two
nodes reflects the semantic distance of the notions. A topic map can be used for the visualisation of various approaches. Similar to a knowledge network an ontology can be represented as a topic map as well. An ontology is a conceptualisation of a domain and reflects an agreement of a group of people. It has a formal specification mostly based on an XML notation. Ontologies are used for knowledge management, knowledge portals, in semantic web, digital libraries or e-learning systems.

“People can’t share knowledge if they don’t speak a common language” (Davenport & Prusak, 1998). An ontology defines the common language as a basis of understanding.

The small ontology in figure 8 defines the relationships of the object MaxPlanck. It is a concept hierarchy where synonyms are defined as well. Therefore it defines a common language.

Figure 8. Small part of an ontology.

Wiki Systems

Wiki systems have been used for more than ten years. The idea is simple: A wiki system is a hypertext system mostly based on the World Wide Web where the user can not only read the pages but may edit the web page online as well. Wiki has become widely known due to the wikipedia. Although the use of wikipedia as a source for scientific work is put into question it even is used widely by many academics to get a first impression of a previously rather unknown topic.

Figure 9. Wiki definition in wikipedia

But the wiki approach consists of much more systems than wikipedia. Wiki systems are used for software development projects (e.g. trac) or used as part of learn management systems like Stud.IP or moodle. In the same way as wikies is a platform for sharing worldwide knowledge a wiki in a learn management systems is a platform for sharing knowledge among participants in a lecture. In an enterprise a wiki system can be used to share the organisational knowledge. Examples can be found in Mader (2008).

However, wiki systems are a collection of pages containing links. There is no other structure and therefore a search engine in a wiki system performs a syntactic search only. The main advantage of a wiki
system is its openness: it encourages everybody to participate in the management of knowledge. More likely that such a system has the newest knowledge available.

Semantic Wiki

A semantic wiki system extends a wiki system and allows the definition of annotations. By these annotations the wiki pages become smarter: properties can be expressed or even relationships between wiki pages can be named and made explicit. Using the example shown in figure 4 a page of a semantic wiki system can define the property of an enterprise and the relationship as well. Figure 10 shows that annotations define the relationship (“is a”) and the property (“taxation”) visualised in figure 4.

Figure 10. Annotations in a semantic wiki for the term: Personengesellschaft (business partnership)

If the annotations are set up properly we can imagine that in this way a semantic network or even a knowledge network can be defined.

From a Wiki to a Knowledge Network

If the concept of annotation is used for the definition of relationship all necessary information is available: the wiki page represents a node in a knowledge network and the annotation defines the relationship. A topic map can be drawn from the information. A system is required which can understand the annotations and represents the structure as a topic map. Unfortunately no such system has been known so far. Nevertheless the wiki system itself supports the process. In the Semantic Mediawiki system it is possible to export a set of pages as a RDF/XML file.
Figure 11 shows the annotation in order to implement the ontology of figure 8 into semantic wiki pages. Once this has been done the pages can be exported as a RDF/XML file shown in figure 12. Instead of an RDF an OWL notation could be used as well. For the next step on the way, see figure 13, a graph representation is missing.

Figure 12. RDF of the annotations in the MaxPlanck example

```xml
<rdf:RDF>
  <!-- Ontology header -->
  <owl:Ontology rdf:about=""/>
  <owl:Ontology owl:imports rdf:resource="http://semantic-mediawiki.org/s/ontologies/">
    <!-- imported page data -->
    <swivt:Ontology rdf:about="http://kiwiki.wi.hs-wismar.de/kipw"
      rdf:label="Academic">
        rdf:isDefinedBy rdf:resource="http://kiwiki/kiwiki/index.php"
        rdf:type rdf:resource="http://kiwiki.wi.hs-wismar.de/kiwiki"
        property:ls a rdf:resource="http://kiwiki.wi.hs-wismar.de/kiwiki"
      </swivt:page>
        rdf:isDefinedBy rdf:resource="http://kiwiki/kiwiki/index.php"
        rdf:type rdf:resource="http://kiwiki.wi.hs-wismar.de/kiwiki"
        property:ls a rdf:resource="http://kiwiki.wi.hs-wismar.de/kiwiki"
      </swivt:page>
    </swivt:Ontology>
  </owl:Ontology>
</rdf:RDF>
```
A so called validator for the RDF/XML notation exists which checks such notations and even can even produce a graph. The graph is rather clumsy and static and can not be seen as a graphical representation of a knowledge network. It is expected that in the near future a topic map can be generated automatically out of a set of wiki pages. The result will not be a fixed graph only: Part of the total graph will be shown and the user can interactively modify the view.

**Knowledge and Knowledge Management in Academic Education**

Various types of formal and semi-formal representation of knowledge have been introduced in the previous chapters. Will these concepts be discussed in academic education?

Knowledge is an important term in any academic education. The students have to learn and then apply their learned knowledge. But is knowledge and knowledge management itself a topic in a lecture (course or module)? Our students in Business Informatics encounter the term knowledge in various modules: Knowledge representation using formal logic is a topic within the theoretical informatics module. Later on the module on artificial intelligence focuses on knowledge representation especially knowledge processing. The business perspective of knowledge management is a topic in the module “information management”. As an optional subject, the undergraduate students can choose a project work in knowledge extraction.

Graduate students can choose a special subject called knowledge management which consists of three modules: knowledge based systems, knowledge extraction / data mining and knowledge management (business perspective). The module on human resource management is strongly related to knowledge management as well.

The topics outlined in the paper are especially addressed in the module “knowledge based systems”. Here the students build and use knowledge management systems for a certain topic. It is used for learning and sharing the knowledge as well. All of our lectures are managed by a learn management system (LMS) called Stud.IP. Every module managed in the LMS has a separate wiki system which again is used for co-operative work and knowledge sharing.

All the other degree programmes lack a topic on knowledge and knowledge management. While in the business administration courses, knowledge management is at least handled from the management perspective. The engineering courses do not offer any knowledge management topic at all. Basic courses related to electrical engineering include logic circuits; students therefore get a basic understanding of logic although this is a subset of propositional calculus only and can not be seen as a topic of knowledge management.
Table 1

Knowledge related topics in degree programmes of the Business and Engineering Faculty

<table>
<thead>
<tr>
<th>Degree Programme</th>
<th>Degree</th>
<th>Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Informatics</td>
<td>Bachelor</td>
<td>Theoretical Computer Science</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Information Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change Management</td>
</tr>
<tr>
<td>Business Informatics</td>
<td>Master</td>
<td>Knowledge Based Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data Mining</td>
</tr>
<tr>
<td>Business Administration</td>
<td>Master</td>
<td>Business Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sustainability Management</td>
</tr>
<tr>
<td>Digital Logistics</td>
<td>Master</td>
<td>Information Technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Business Intelligence</td>
</tr>
<tr>
<td>Multimedia Techniques</td>
<td>Bachelor</td>
<td>Propositional Logic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boolean Algebra</td>
</tr>
<tr>
<td>Multimedia Techniques</td>
<td>Master</td>
<td>Data Mining</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>Bachelor</td>
<td>Boolean Algebra</td>
</tr>
<tr>
<td>Process Automation</td>
<td>Master</td>
<td>—</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Bachelor</td>
<td>—</td>
</tr>
<tr>
<td>Ship’s Operating Technology</td>
<td>Bachelor</td>
<td>—</td>
</tr>
<tr>
<td>Plant operation and Supply Technology</td>
<td>Bachelor</td>
<td>—</td>
</tr>
</tbody>
</table>

In the various degree programmes at the Wismar Business School (Business faculty) knowledge management will be discussed as a management topic especially as a human resource management one. Only in the Business Informatics degree programme, students learn about formal representation of knowledge and the management of knowledge using information technology. It can be seen in table 1 that the engineering degree programmes do not handle knowledge or knowledge management in their modules. Although Boolean algebra is a basic logic formalism, it is not sufficient for formal representation of knowledge. It can be assumed that a similar situation could be found at other universities as well.

It is expected that knowledge management is an implicit topic in various degree programmes: every student needs a kind of personal knowledge management and at least in exams, knowledge has to be expressed explicitly. Project work as another example needs the exchange of knowledge among the team members. Although there may be more examples for knowledge management in academic education, it still lacks an education in a (semi-) formal representation of knowledge using various techniques or tools of information technology.

**Conclusion**

It can be summarised that there are three current developments in IT based knowledge management:

- formal representation of knowledge using business rules,
- knowledge networks
- and semantic wiki systems.
Knowledge networks are powerful and can be visualised user friendly by topic maps. Moreover a semantic search is available which improves the search process as it finds answers a syntactic search cannot find. The high amount of work necessary to establish a knowledge network is a serious drawback.

Wiki systems are easy to use and encourage people to take part in the development and maintenance of such system. Unfortunately up to now a wiki system cannot contain the same kind of knowledge representation a knowledge network can. Wiki systems are still text based and named relationships are unavailable, limiting the search to a syntactic one. Semantic wiki systems open the door to smarter wiki systems. Properties and relationships can be defined via annotations. This enables the automatic development of a topic map out of a wiki system. A formal definition using an XML based language like the OWL can be used as an interface between the wiki system pages and a graphical representation as a topic map. Although no working system has been known so far it is expected that we will have graphical visualisations of wiki systems in the near future. These systems will provide better understanding of complicated topics since a network of terms and relationship is a condensed view on a topic and visualises the underlying structure.

(Business) Rules are definitely a formal representation of knowledge: Expert knowledge, workflows or business logic can be expressed by rules and can then be processed. Although rules are the more formal approach they are comprehensible and can therefore be used for documentation or the exchange of knowledge between human beings as well.

Students will have to deal with knowledge during their entire professional life. We are aware of the fact and try to explicitly incorporate the topic “knowledge” into our degree programmes. It is argued that knowledge, and the management of knowledge, especially formal representation of knowledge should be integrated into business and engineering degree programmes. A successful knowledge management based on appropriate information technology is a key issue for any organisation.

References


The Study on Business Plans and Development of College Students’ Innovative Ability

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Abstract

The paper is based on the systematic summary of our students who have been participating in China Business Plan Competition in the past 12 years, using methods of literature, questionnaire and AHP, studying problems of college students in the first class learning and influencing factors of individual entrepreneurs variables and entrepreneurial intentions to gain approaches and methods to cultivate and improve the creative ability of college students.

Keywords: Business plan, challenge cup, innovative quality
Background

The Situation of Undergraduates Taking Part in the Plan of Starting an Enterprise in Our University

The business plan and the contest.

To start an enterprise means choosing a new technology production or service which has market possibility. It will be a commercial plan. So this commercial plan will introduce a new production into the market. Also the new modern company will be set up. It contains real maneuverability and can be run through adding funds. Meanwhile, the enterprisers invest more fund, to create useful environment, and help the plan come true.

The plan to start an enterprise focuses on a certain strategy, aim, and activity. It is easy for unprofessional people who are interested to understand it. The readers of this plan may include people who want to join the company: investors, partners, suppliers, customers or policy development and advisory bodies.

The contest of business plan can be also called the contest of commercial plan. It requests that contestants make up team groups in order to provide a new production which contains the market possibility according to investment risk and get the return of investment. Based on the information on the market, to finish a completed standardized system, there should be a workable and convincing business plan. By means of joining trainings and competitions, our project design will be perfected, will attract risk investment, and then promote the establishment and practice of high-tech venture company.

The advance product or service must be innovated and created by participants, or authorized by related administration. Or it can be the conceptual product or service which can be developed or researched.

The characteristics of the business plan are followed. The members have certain general theory, specialty, cross science and new knowledge. The product of service should have market prospect, and the business plan must have integrity, specificity and depth.

Brief introduction of "The challenge cup" business plan competition for Chinese college students.

In China, the business plan competition was firstly held in the Qinghua University in 1998. The session of "challenge cup" Chinese university students' business plan competition was held successfully in Qinghua University by the central authority of the Communist Youth League, the Chinese Science and Technology Association, and All-China Students' Federation in 1999. It has produced fine social influence. Under the general public regard and support, many business plans have entered the actual operation stage. Technology, capital and marketplace have moved forward to deeper integration. A batch of high technology companies has been set up.

Business plan competition adopts three levels compete system. It is divided into three phases: tryout, semifinal, final. Tryout and semifinal need written review. Final needs to make a debate on site and show result. Prize includes gold cup, silver cup and bronze cup. Then, it needs confirmation of the participants for the final competition to go to the competition place for the final round, recording and broadcasting the final competition, organizing the awards evening party, holding the auction of winning works in the competition, and organizing the transference.
The situation of our university participating in the "Challenge Cup" Business Plan Competition for Chinese University Students.

Our university has participated in the "Challenge Cup" Business Plan Competition for Chinese University Students for six consecutive sessions, winning two silver awards and ten bronze awards which have become the highlight of the Second Class of university students and the representatives of the universities in Hebei Province. Meanwhile, our university has won the “Award of Outstanding Organization in University” issued by the Central Committee of the Communist Youth League, Ministry of Education, China Association for Science and Technology and All-China Students Federation.

Shijiazhuang University of Economics was highly praised by higher authorities for organizing students to participate in competitions continuously and achieving gratifying results. The reports of such major news media as Hebei Daily and Yanzhao Metropolis Daily, together with the concerns from the national universities and society, make our school win much honor and gain reputation, promoting the reform of the First Class and improving teaching quality and effectiveness.

Evaluation of Business Plan Competition.

It has become the times requirements for achieving the great revival of the Chinese nation to implement vigorously the strategy of “invigorating China through science and education”, build an innovative nation, strive to cultivate the innovative and pioneer awareness of the majority of young people and create a generation of high-quality talent that can meet future challenges. As a new carrier of student’s scientific and technological activities, Business Plan Competition is bound to play a more active role in such aspects as cultivating multi-disciplinary and creative talent, promoting the combination of university’s industry-study-research and advance the establishment of domestic risk investment system.

Students will receive a lot of resources when they participate in Business Plan Competition, such as the support from the university: leadership, funds, from teachers: guidance, consultation, training; from society: sponsorship, enterprises, institutions, experts and media and so on.

When the majority of students complete their workable business plan and the competition is held under the guidance of teachers and entrepreneurs, the process is favorable to motivate them to study hard, encourage and foster young their’ pioneering spirit, improve young students’ innovative productivity and quality in transforming science and technology into productive forces when facing the needs of modernization, which accordingly helps them make better career planning and start their own business.

Discussion

Problems of College Students in the First Class Learning

Unclear learning objective, lack of goals in life planning.

Learning objectives play an important guided and promoted effect in learning as factors to engender and keep learning motivation. With a clear purpose, we will have sufficient motivation. In the survey, we found that the learning purpose of most students is not clear, whether it is to "perfect and achieve self-actualization", “improve social status” or "earn more money to pursue material life”, etc. All of this showed that majority of students have clear learning purposes and strong desire to be talented. However, life goal has layers. The motivation can be sustained only when rising to a noble life purpose, combining learning and spiritual values. Conversely, motivation is easy to disappear once achieved when the target is relatively low, only limited to earn more money in pursuit of satisfaction of material life and fame.
Low entrepreneurial passion of contemporary college students.

Students have no market experience, and are interpersonally immature which result to the low entrepreneurial passion of contemporary college students.

Lack of creativity.

In the traditional teaching mode, students accept knowledge teaching by teachers passively which focuses on understanding and memory of knowledge, lack of creative thinking and innovative practice, and thus weaken their sense of innovation. In addition, lack of integration among the various disciplines, so that students acquire new knowledge and technology outside of their specialization, and gradually lack of associative and divergent thinking ability as well as reverse thinking, result in less innovation and difficulty to achieve creation.

Some schools not placed enough emphasis on the second class.

Most schools are always used to take the amount of knowledge students received as standards without considering the student's level in learning and the practical ability to apply knowledge, paying much attention to student test scores while neglecting self-exploration and ability to sum up the innovation of the student, not placing enough emphasis on carrying out the second class.

The Entrepreneur’s Performance Appraisal

This article is theoretically based on education, innovation, science and the Higher Education Law of the People's Republic of China and other related theories.

We build the individual entrepreneurial performance evaluation index system in conclusion of more than ten years experience of organizing and guiding our university students’ business plan competition and reference to Robert • Hornet’s the conceptual model of entrepreneurship (see Appendix I: Entrepreneur’s Performance Appraisal Index System.)

During the individual business performance evaluation, we use questionnaires to obtain the raw data and expert scoring for index data to calculate the individual business performance by AHP (see Appendix I.: Entrepreneur individual variable schedule of survey; and Appendix III.: The influencing factor of College Students' intention of starting an enterprise schedule of survey).

Taking entrepreneurial performance of 50 students who started in 2008 before and after the experiment as an example, 100% of the students’ business performance has been enhanced through experiments. The average entrepreneurial performance before the experiment was 0.47, but 0.69 after the experiment, increasing by 0.22. The entrepreneurial performance scores above 0.5 was for 22 people before the experiment, occupying 44.0% and 47 people after the experiment, occupying 94%. The most significant increase of the entrepreneurial performance scores was 0.37 before and after experiment. There were 35 students with entrepreneurial aspirations, occupying 70%. The entrepreneurial aspirations increased to 50% compared to 20% before the experiment; 45 students realized the basic processes of entrepreneurship and knowledge, occupying 90%, which increased 80%, compared to 10% before the experiment; the entrepreneurial capacity of 30 students has obviously improved, occupying 60%, an increase of 40% compared to 20% before the experiment; eight students have been registered officially and founded their own company, occupying 16%. Through the Experiment in the experimental area, the students got to improve entrepreneurial performance, enhanced entrepreneurial aspirations, enriched entrepreneurship theory, upgraded entrepreneurial capacity and carried out entrepreneurial practice.
The Improvement and Cultivation of the Undergraduates’ Innovative Quality

All civilizations of the world are the result of innovation. If there was no innovation in the past, there would be no civilization of today. If there is no innovation today, there would be more brilliant civilization tomorrow. To launch the Business Plan Competition is beneficial for the improvement of students’ innovative quality.

Inspiring students’ passion for studying.

The First Class and Second Class are two important platforms for students’ study, the teaching content and methods of which can be used for reference and are indispensable to each other. The First Class in China has complete system, but there is too much theoretical teaching. Although it is beneficial to build knowledge structure and develop knowledge integration for students, it does not have specific aims and is not practical. The Second Class, in particular the Business Plan Competition, exactly makes up for the insufficiency of the First Class.

Business Plan Competition is an important part of the Second Class. Through participating in the activity, students apply their knowledge, and find their shortcomings in their own knowledge structure so as to be eager to learn and attach great importance to studying and learning with specific purpose. We believe that one of the contributions of the Business Plan Competition is to enable students to know themselves, know what they lack and how to do things in the future. It is inspirational to students in enhancing innovation quality along the following three points:

First, for each university student who faces the future and expects success, he should seriously consider such a question: Can I become a popular creative talent?

Second, we should recognize that participating in extracurricular technological innovation activities is not only the need to improve our own quality and capacity, but also the need of the times.

Third, the orientation of examination-oriented education to quality education means that our teaching ideology, teaching methods and curriculum should insist on improving our overall quality.

Then, how do we change our study concept scientifically?

1. Change dependent learning into independent learning. We believe that contemporary college students should possess three kinds of capabilities: self-learning ability, knowledge integration capabilities and innovation. Research shows that the improvement of self-learning ability is 80% in the students themselves and 20% in the university and others.

2. Change learning knowledge and shaping intelligence into learning how to be a real man. University education includes knowledge, innovative education, and moral integrity education as well, which are to be undertaken by teachers, administrators and service staff. In today's society, competition and pressure of survival and development are severe, so moral integrity and communication education are in the first place while knowledge and intelligence education are secondary.

3. Change from closed learning to open learning.

4. Change from inherited learning to creative learning.

5. Change from "having learned" to "being capable of learning". Method, though not the decisive factor in innovation and pioneering, is certainly the key factor. The choice of methods depends on research purpose and the nature and characteristics of research object. The most fearful enemy for a person is his old habit of thinking.

Enhancing students’ information consciousness.

Modern science holds that material, energy and information are three basic elements of constituting an object. To complete a nice workable business plan, one needs to gather large amounts of
information, look up a large number of books, magazines and newspapers through the university library, provincial library, bookstores and network, visit government departments, businesses, news organizations, experts, and conduct surveys on market and competitors.

Developing students’ ability of research and practice.

To complete the business plan, one needs to experience the whole process of “information collection → question → scientific question → scientific research questions → scientific research topic choosing → research → argumentation and reasoning → scientific conclusions → innovative scientific research, and conduct a great deal of scientific research activities. By completing business plans, one can understand the importance of applying theory into practice and learning how to carry out research and practice.

During the process of completing a business plan, university students need to have a deep understanding of technology, market, and modern company, need to keep in touch with experts, consumers, entrepreneurs and government, and need to cooperate with partners of project, which is beneficial to develop the style of applying theory into practice and overall quality of identifying problems, analyzing problems and dealing with problems.

Young students’ practice contains two major parts as science and technology practice and social practice. Nowadays, these two practices are very important for the growth of young students. Based on applying technology and service to the market, a business plan includes both technology practice and social practice and links the two better. Although Business Plan Competition sets business plan assessment as the basis and make students’ business plan become true, it attaches great importance to the process of completing business plan and brings activity’s function in cultivating talent into full play.

Cultivating students’ team spirit.

Business plan involves many contents and a wide range of knowledge, nearly involving all aspects of MBA programs. Being different from other extra-curricular science and technology works, business plan involves the whole process from alternatives (product or service) to setting up companies and successfully applying product or services to the market. Only by uniting and exploiting team spirit, learning from others’ strong points to offset self weaknesses in professional structure, can a group accomplish plans successfully.

Improving students’ expression skill and social etiquette quality.

The final competition of business plan refers to three aspects, including official statements, answer to questions, and the overall performance face to face with jury. Gathering information and market research need them to deal with many units and many people, so eloquence of expression and quality of social etiquette are essential. With the help of the business plan activities, and the guidance and training of teachers, the quality of this area will be greatly enhanced.

Helping foster the entrepreneurial concept in the age of knowledge economy.

Knowledge economy is the economy based on technology. The development of knowledge economy needs a large number of technology entrepreneurs, and has changed some concepts of traditional business. A technology may become a new growth point that leads to the development of an industry; a company may become a giant company in a short time. The age of knowledge-based economy is a valuable development opportunity for our country to own huge human resources. So we should encourage college
students to raise the banner of entrepreneurship, foster entrepreneurship spirit, promote a group of future entrepreneurs who will stand out, and promote the emergence and development of technology companies.

Business competition starts the entrepreneurial thinking, nurtures the entrepreneurial passion of college students to a certain extent. The establishment of college students innovation center and college students business park promote college students’ ideal dream of business becoming reality. Pioneer Park and entrepreneurship centers of college students as part of the university science park incubator of college students technology enterprises, train highly qualified creative talents, and stimulate the entrepreneurial passion of college students. At the same time, they have important sense for raising the level of entrepreneurship competition and raising levels of entrepreneurship of college students. It has far-reaching implications to promote the change of university technological achievements and high-tech industries.

Helping students train for innovation quality.

We believe that the innovation quality of students includes innovation capacity and innovation thinking ability. Innovation capacity includes knowledge innovation and technical innovation; innovative thinking includes the awareness of innovation and the spirits of innovation.

Knowledge innovation ability includes new perception and understanding capacity and spanning capacity to professional knowledge, understanding of new knowledge and discovery of new knowledge. Above all they are involved with professional education.

Technological innovation includes the ability to solve existing technical problems, understanding new technologies and development capability of new technology. Above all they are involved with practical education.

Sense of innovation includes a love of science, interest in science and curiosity; innovative spirit includes sufficient self-confidence and indomitable will. It also requires professional education and practical education.

College students business plan competitions are on areas of practical education, but they it directly and indirectly affected professional education. Professional education and practical education are beneficial to train students’ observation ability, thinking, imagination, practical skills, language skills, communication skills, summing up the outcome ability and self-understanding ability.

Conclusion

Business competition gives students a unique training opportunity, a real opportunity to exercise, which allows us to experience the hardship of entrepreneurship, feel the intense social competition early, and understand deeply the requirements of the quality of community college students. All colleges and universities advocate for and encourage students to participate in entrepreneurship competition in order to improve students’ practical abilities and this overall quality, and train high-quality talents adapted to society.

References


Appendix I

Entrepreneur’s Performance Appraisal Index System

<table>
<thead>
<tr>
<th>(A) Evaluation Indicator of Entrepreneurs’ Effect on Venture Performances</th>
<th>Entrepreneurs’ traits (B1)</th>
<th>the trend of innovation (C11)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>the trend of taking risk (C12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the trend of enterprising (C13)</td>
<td></td>
</tr>
<tr>
<td>Team Competence (B2)</td>
<td>Team Leadership (C21)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Team coordination (C22)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Skill in team control (C23)</td>
<td></td>
</tr>
<tr>
<td>Ability of realizing the goal (B3)</td>
<td>Objective definition (C31)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Objective rationality (C32)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Objective difference (C33)</td>
<td></td>
</tr>
</tbody>
</table>

Appendix II

Entrepreneur Individual Variable Schedule of Survey

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Not sure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The most important motive of university students’ innovative undertaking was desire to achieve.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The characteristics of funding of decision-making independently can help undergraduate entrepreneurs succeed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Strong self-confidence is the essential factor of the undergraduates’ succeeding in pioneering work.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The firm endurance when facing with adversity is the essential factor of the undergraduates’ succeeding in pioneering work.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Speed and quality of discriminating opportunities for establishing a business is the crucial factor of succeeding in establishing a business of the undergraduates.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Having distinctive creative ability is the kernel factor throughout doing pioneering work of the undergraduates.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Having distinctive creative ability is the kernel factor throughout doing pioneering work of the undergraduates.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix III

The influencing factor of College Students’ intention of starting an enterprise schedule of survey

A. Basic information

<table>
<thead>
<tr>
<th>Sex</th>
<th>☐ male</th>
<th>☐ female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>☐ freshman</td>
<td>☐ sophomore</td>
</tr>
<tr>
<td></td>
<td>☐ junior</td>
<td>☐ senior</td>
</tr>
<tr>
<td></td>
<td>☐ graduate in the first year</td>
<td>☐ graduate in the second year</td>
</tr>
<tr>
<td></td>
<td>☐ graduate in the third year</td>
<td>☐ doctor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>From</th>
<th>☐ please fill in your province</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your subject</td>
<td>☐ liberal arts</td>
</tr>
<tr>
<td>Your age</td>
<td>☐ under 20</td>
</tr>
</tbody>
</table>

B. Survey item   1 means strongly agree  
2 means moderately agree  
3 means agree  
4 means neutral  
5 means disagree  
6 means moderately disagree  
7 means strongly disagree

1. I don't like a invariable life, and I like to make changes
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

2. Try new things to have a better life.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

3. I like to solve problems through new methods.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

4. In a group, I like to be the captain.
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

5. I trust my judgments
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

6. I find it hard to believe parents’ and teachers’ authorities compared with others
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

7. I find it hard to believe someone would want more after succeeded something
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

8. It is important for me to accept new challenges
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

9. I like to do the best in everything
   ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

10. Most of the entrepreneurs live a good life
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

11. To start your own business is good way to improving financial condition
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

12. Starting your own business is a piece of cake
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

13. I think the supply of enterprise technology is complete
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

14. I don’t think there is a problem about entrepreneurial finance
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

15. I think we’ve been already equipped with social fund (social network).
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

16. Since the chance to find an ideal job is slim, I have to start my own business.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

17. Compared with other careers, starting a business can make my life easier.
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

18. Pioneering experience is helpful to better future career
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

19. I’m inclined to start my own business after graduation
    ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7
Design and Establish an Innovation and Entrepreneurship Undergraduate Study – A Feasible and Comparative Case Study in China

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Abstract

The current study demonstrates a practical case on establishing an "Innovation Study" in a professional undergraduate bachelor program. The process establishing and analysis illustrates the every important stage, element and most of all, details for such a program, including educational objectives, curriculum, implementation modalities, evaluation and teacher-building, and others. Throughout this case, the readers reflect on the innovation though into higher education and how innovation elements will be integrated into daily tasks, while colleges and universities maintain professional characteristics and academic strengths to continuously improve the quality of education and teaching and to fill in the field of research and remedy gaps in the system. China needs innovation thought and entrepreneurship skills everywhere, also in colleges and universities where innovators guide the profession of teachers and students into "innovation school" in education and learning. Higher education is changing from tradition to modernity, from closed to open, from the focus on the current path towards sustainable development, and comprehensively promote educational innovation; can provide the relevant functional departments of colleges and universities to provide decision-making; can satisfy society's demand for innovative talents.

Keywords: Innovation studies, undergraduate, personnel, training programs, design, comparative study
Background

Innovative science education is to train students in basic innovation, creative consciousness, creative spirit, innovation for the purpose of educational thoughts and practice. Academic education and vocational education are of equal importance. Teaching and educating innovation becomes the world's modern education development and introduces a new trend in China. The world leading experts believe China is facing an unprecedented innovation opportunity. Innovation gains a firm foothold in China more than other countries.

The 21st century is the 'new era' of competition between countries now aiming to the level of focus on innovation. According to Nankai University Business School Professor Zhang Yuli, the boom of innovation since the 20th century and flourished since the 80's again, not only has created a founder of the new business activities but also has become the people's way of thinking and behavior. As a result, science and technology innovation applied into practical productive improvement, again, has become an important engine for economic development.

Innovation has become in many countries, including China, a manifest or policy. In April 2002, the Ministry of Education of China observed that the People’s University of China, Tsinghua University, Beijing University of Aeronautics and Astronautics, Heilongjiang University, Shanghai Jiaotong University, Wuhan University and other 9 universities started innovative education as the first pilot. In September 2005 the International Liaison Department of the Central Group, an international organization and the first United Nations Youth Employment Network in China, a cooperation project launched in conjunction with the Office of Innovation Education pilot project was officially launched at the university. At present, innovative education has been a common practice in many colleges and universities across China, has achieved good results for the students to create good conditions of employment.

Different economic systems require different core elements, so does science and education subsystem which again has different requirements and performance. China needs knowledge-based economy and the establishment of innovation-focused national strategies for economic development, and this again reflect the new demands of higher education. In this context, it is crucial for China’s higher education to build up innovative service-oriented teaching and research focus.

Study and practice of innovation subject can be an interesting reference work for others, in comparative study of regional or national "innovation studies" for both undergraduate and postgraduate education. This reference work could make great significance for further innovation research. Through research and practice in this subject there will be more comprehensive understanding and more experiences of the professional training and education of innovation and social demand.

Moreover, the establishment of innovation study intends to explore and test theories and practice results, to be able to integrate the results of educational reform in different contexts, expanding personnel training model. The innovation study might also assist actors to maintain the professional character and for academic institutions of higher learning to continuously improve the quality of education and teaching. The study also aims to limit the gaps between the field of research and practice, and guide the professional conduct of teachers and students for "innovations" education and learning. Such study program will promote the university as soon as possible from traditional to modern, from closed to open, from the current trend of sustainable development based on fully promoting educational innovation, and meet the community's innovation and science talent demand for the local and national socio-economic development and make new contributions. Innovation research results have important demonstration effect to engage more people in the field and promote the significant value of practical implementation of innovation into the education system.
Research Problem

Despite the wide variety of innovation definitions, how shall an innovation undergraduate bachelor program aim its emphasis on the major thematic focus and how shall this emphasis reflect on the study program’s curriculum?

Theoretical Framework

China, as the UNESCO "creative education" subject, a member of the innovative education started late, beginning in the early 90’s. After the first phase in 1990-1991 and 1992-1994 in the second stage the study achieved a number of research results, mainly "on a number of innovative education issues" (The author is Mao Jiarui, Peng Gang, Chan King Park), "innovative education programs, objectives and evaluation"(author Maojia Rui, Peng Gang, Chan King Park),"Rural Education Reform and Innovation in Education and" (The author is Mao Jiarui, Mana),"quality education and creative education" (author Peng Gang, Caishou Long), and "Creative Education Series" (edited for the Mao Jiarui). More researches is were made on innovative educational objectives, curriculum, implementation of innovative education, continuing education, rural education, comprehensive education reform and innovation, quality education and innovative education, innovation and education on issues such as a useful experiment to explore, review and reflect on the innovative educational practice.

Overall, there are many articles, but fewer direct studies of small innovative education in higher education. Many studies merely focus on the macro level, to investigate the significance of innovative education. Some lack the details or show too microscopic understanding, lack of development of higher education and higher education reform from the perspective of innovation and education, and research on the lack of systematic innovation and education, lack of suitable high educational characteristics of the actual development of higher education to meet the current systems of innovation and educational theory. Innovative education universities say innovation is very necessary; however but for creative education, is often limited to a few influential activities.

The theoretical framework is the basic curriculum which is the theory for establishing new innovation education. Theories include university education, scientific research and knowledge innovation, the definition of innovative education and creative education in science content. The curriculum is sourced by many innovation related studies, through in-depth analysis of the definition of innovative education, creative education and employment described education, and the dialectical relationship between entrepreneurship education and practical business incubation. International experience consist of crucial beneficial elements, such as foreign innovative education development and current situation, including foreign innovative education case study of training and foreign innovative education practice and experience. From the point of complete systems to study the experience of Europe and the United States and the creative education of China, a course can be set to implement innovative education in China learning from corresponding cases.

It is important and beneficial to analyze current innovative education development in China and the analysis might contribute to correct focus on the content of innovation education. The analysis includes the development of China's higher education innovation profile and our innovative education problems and causes. Comparison of Chinese and foreign education through innovative and creative education in Chinese universities, analysis of the current situation carefully and of the meanings of the current problems in higher education, and the causes of the problems. In view of the universities’ implementation process of innovative education, the main problems, such as insufficient understanding of innovative education, research on innovative education and in the theory of small, inadequate educational resources, innovation and education, culture and other issues are not strong, as revealed in an in - depth analysis.
To strengthen and build innovative education system, in universities there has to be an inclusion of a clear goal innovative education leader in creative education. Innovation and education courses are set up to carry out the core of innovative education. Flexible, innovative education in the implementation model is the way to creative education. The strengthening of the construction of teacher education is the key to carrying out innovation. Elements of innovation within the education system starting with the structure, from the pedagogical point of view (rather than the traditional economic point of view) the objectives of innovative education, curriculum, implementation of the model, evaluation and teacher development are analyzed to find out whether creative education in colleges and universities has effective implementation.

Innovative undergraduate bachelor program includes basic framework and guidelines, as training objectives and training requirements, training measures, graduation total hours of total credit, and classroom, professional core courses, professional features courses, curriculum and teaching schedule.

Methodology

The Method Approach: The subject of the study is based on the school’s aims to maintain quality education and educational innovation. Creative people as the core, follow the rules of education, based on education management, sociology, law, statistics and other related theories, using international references such as innovation studies in Norway, Germany and France. Comparing and gaining experiences on "innovation education", cases and curriculums from exchange visits in Norway, Germany, France, are used in the qualitative and quantitative research method of combining research.

Practical ideas: Comparative analysis, interview, questionnaire, literature, multi-layer structure, classification of cluster model method to collect detailed information and data to summarize, and analyze; undergraduates majoring in the education process innovation, impact factor, operating mechanism, based on the development of innovative training program of undergraduate talent, and innovation and professional training school practice; the final formation of the overall research and innovation and personnel training programs of undergraduate study.

Methods: The research methods are literature review, surveys and comparative analysis. Literature review includes quite few materials such as the following: Innovation education at home and abroad on the practice of information on innovation; Innovative educational thinking related to education and educational theory; Concepts of creative education, innovation and education principles and innovative teaching methods; CNKI China Academic Journal, EBSCO HOST database platform in the periodicals, databases related to China's outstanding Repository of excellent papers, and other related innovations, innovation education and academic monographs which widely share research data, to grasp the overall situation of the study, analysis of the cutting-edge issues and hot issues, combined with practical experience and research making up the scope of the study.

The survey primarily through the investigation of this subject aims to understand and grasp the foreign education systems and operational status of the implementation of innovative education. Creative education in colleges and universities found that the operation of the problems and contradictions and sharing of first-hand information, lead to the implementation of innovative education in colleges and universities through pertinent suggestions and comments.

Comparative analysis contributes clearly to awareness of our shortcomings in innovative education, because comparative analysis helps us find the gap thus improving it. This study, is based on Innovative Education in the U.S., and field survey of Norway and France to compare objects, ideas and consciousness, economic system structure, policy environment and cultural atmosphere, etc to comparison of China, Europe and the United States in terms of Innovative Education gap, to better promote the effective development of innovative education in China.
Discussion

The Current Models of Innovation Study in China

At present, innovative education has gradually become an integral part of higher education, but not to a big proportion. Chinese University of innovative education endeavors to emulate and copy the American College of Innovative Education. Because China's social background, social system, educational status and level of economic development are different from those of the US, the two universities’ innovative education and innovation should also be different. Innovation on higher education in China and the status of university students and forms of innovation perspectives, are still at a low level and the initial stage, which is our current level of education, economic development, and personnel training mode and at such capital is directly related to risk awareness.

Table 1 illustrated three (3) representative Chinese universities and their different innovation education models and focuses. The first Chinese People's University highlights innovative education that focuses on training students innovation consciousness by establishing knowledge structure, and improving the overall quality of students, and encourages students to creatively engage in various social practices and social welfare activities, innovations and education through seminars, as well as various contests, activities, etc., there is a professional backing of the project and organization of a form of "innovative education through community practice.

The second model focuses on Beijing University of Aeronautics and Astronautics for the representatives to improve their innovation and knowledge, innovation and skills. It features commercial operation, the formation of Pioneer Park students, teaching students how to innovate, and innovation to provide financing for the students, and advisory services. Schools set up the “Innovation Management Training Institute,” dedicated to innovation and related matters for students. The school also set up 3 million RMB of the innovation fund for innovative projects on students’ books for seed funding.

The third model is Shanghai Jiaotong University showing integrated approach in innovation and education. The innovative entrepreneurship education is the foundation of Specialized Knowledge intended to pay attention to the students basic quality of training and to provide the students in the capital and necessary technical advice. The university invested more than 8000 million RMB to establish a number of test centers and innovation base. The professional school for students is open around the clock, in order to cultivate the abilities of students. Graduate students in the school set up by the Innovation Company, have settled in Shanghai’s, technological innovation base. Now the university is not a pilot though there is no clear innovative education curriculum, but is steadily penetrating innovation in practicing the concept of education. People at the center of Fudan University, form a spirit of innovation in students and practice in teamwork training, 11 Innovation Teams, 11 Innovation guidance experts for graduates to process innovation support. Currently the school has 500 projects funded, and more than 100 per semester student research projects applying for subsidy.
<table>
<thead>
<tr>
<th>University</th>
<th>Mission</th>
<th>Teaching focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>People’s University of China</td>
<td>Focuses on training students in creative consciousness, the knowledge needed to build innovative structures, and improvement of the overall quality of students.</td>
<td>The first issue will be combined with the issue in the second class to carry out innovative education.</td>
</tr>
<tr>
<td>Beijing University of Aeronautics and Astronautics</td>
<td>Pays attention to the improvement of their innovation</td>
<td>Knowledge and innovation skills. Commercial operation, the establishment of innovative college students’ park, to provide students with financial assistance and advice Service.</td>
</tr>
<tr>
<td>Shanghai Jiaotong University</td>
<td>Creation by the students of a comprehensive integrated industry quality</td>
<td>On one hand students will be taught the basic elements of innovation. On the other hand students will be provided with innovation, funds and the necessary technical advice.</td>
</tr>
</tbody>
</table>

### Curriculum for Proposed Undergraduate Bachelor Study of Innovation and Entrepreneurship

Based on theories and comparative analysis of existing models and experiences, national and international, the new proposed bachelor program of innovation and entrepreneurship will be launched as innovative teaching profession "2 +1 +1" Model; that through innovation in the economic and trade institutions with professional backing of Management, students in the basic course of study after two years, according to individual preferences and needs for creative professionals choose, innovative professional in the junior year of professional training for one year, and seniors for one year of professional practice. "2 +1 +1" means students start in the school for 2 years of theoretical study, 1-year professional courses and 1 year placement in the enterprise within a calendar year. Core curriculum areas should be set in the third year. The university sets up the basic education curriculum covering a wide range of students after freshmen, sophomores and juniors learn basic courses. They have a certain social, cultural and natural science knowledge enhancing the spirit of human accomplishment and scientific training and a certain knowledge of the preparation of reserves; In addition, the students through two years of university life, physiologically and psychologically mature and their discussion of more complex business problems will deeper.

Course structure is divided into 3 categories as basic, compulsory and optional, illustrated in table 2. in accordance with class enrollment, separate cultures based on the wide scope training through curriculum implementation. Courses are divided into public courses, academic foundation courses, specialized courses of three modules. Public class students study the first year, second year course to learn basic subjects, the third year of study and professional courses. Among them, the first year in learning the course can enhance the moral quality of students, human quality and creative quality. The second year courses enable students to systematically study and grasp economics, management, marketing theory and methods. Key learning courses in third year enable students to master the innovation system, science, entrepreneurship and corporate governance of the basic theories and methods. The fourth year consists of graduation practice and writing major papers. As regards teaching methods to enhance teaching, with practice teaching, with full use of modern educational methods and techniques will inspire creativity and entrepreneurial passion of students.
Table 2
Curriculum for Proposed Undergraduate Bachelor Study of Innovation and Entrepreneurship

<table>
<thead>
<tr>
<th>Basic courses</th>
<th>Compulsory courses</th>
<th>Optional courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microeconomics</td>
<td>Business Project Management</td>
<td>Social Practice, Social Survey and Reading Note</td>
</tr>
<tr>
<td>Management</td>
<td>Independence Research</td>
<td>Human Resource Management</td>
</tr>
<tr>
<td>Accounting</td>
<td>Creation of New Enterprises</td>
<td>Studies on the WTO</td>
</tr>
<tr>
<td>Macroeconomics</td>
<td>Entrepreneurial Spirit and Quality</td>
<td>Advertising</td>
</tr>
<tr>
<td>Economic Law</td>
<td>Business Plan</td>
<td>E-commerce Technology Foundation</td>
</tr>
<tr>
<td>Innovation Science</td>
<td>Venture Project Evaluation</td>
<td>Corporate Value Analysis</td>
</tr>
<tr>
<td>The Basic Principles of Business Statistics</td>
<td>Innovative Team Management</td>
<td>Principles of Insurance</td>
</tr>
<tr>
<td>Linear Algebra</td>
<td>Business Communication</td>
<td>Investment and Portfolio Management</td>
</tr>
<tr>
<td>Probability and Statistics</td>
<td>Production and Operations</td>
<td>Internet Finance &amp; E-money</td>
</tr>
<tr>
<td>Marketing</td>
<td>Customer Relationship Management</td>
<td>Cross-cultural Communication</td>
</tr>
<tr>
<td>Social Surveys and Academic Papers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Thesis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Referring to the research question quoted early in this article, the thematic focus of the innovation study can be reflected as substantial basic courses, and business focused compulsory courses, as well as wider optional courses with relatively heavy emphasis on human and social aspects. This combination will contribute a complex learning plan for the new innovation and entrepreneurship bachelor study and corresponding curriculum.

The Focus on Teaching Methods

The new innovation bachelor program also addresses teaching methods and teaching objectives for achieving completely the task of teaching. The meaning is very important, which is to enable students to acquire knowledge and develop the capacity of the guarantee.

- Problem-Based Teaching: Problem-solving is the central organization of teaching. Such teaching method can solve the theoretical questions and solve some of the problems encountered in practice thereby encouraging students to think actively. For example the questions are: "How will you perform effective communication and public relations for business contacts in the real business? How will you stimulate entrepreneurship and business groups’ and individual’s creative potential? How will you use resources and the development of business plans efficiently? In this approach the students will not only think alone, but also in small groups to discuss and even debate, not only to train students to independently analyze business problems and develop their ability to judge, but also enhance their awareness, cooperation and competition ability.

- Case Analysis Focused Study: Case study will be applied in many courses. Entrepreneurial education consists, not only of theories, but also of business case analysis, and such analysis will enable students to learn from experience. The experience and lessons learned have to be rational. For business case analysis, consider to enable professionals to participate in teaching. For example, students are invited to discussions and lectures with the industry. Reports on their business process to form fresh case studies, can increase the interest of students and enhance their analytical business capabilities.

- Using Additional Teaching Materials: According to the needs of schools, there should be appropriate use of pictures, physical and other visual aids and projectors, slide projectors, television, sound recording and computer-assisted teaching, modern teaching methods to enhance the intuitive
knowledge, the image and three-dimensional nature of knowledge and understanding to accelerate the process.

References


MCS-IEQ Model: A Management Control System Model with Quality Approach

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Abstract

This study is a confirmatory that carries out by testing several hypotheses in order to figure out the causal relationship of all the above variables. Population is 205 manufacturing companies in East Java. All of them hold SNI products. This study employed complete enumeration or census method; hence, sample and sampling technique were not required. The technical analysis applied to test the research hypothesis was Structural Equation Modeling (SEM) with support of Amos 5 program. The results of this research show that there are positive and significant relationships between communication level of objectives, frequency of feedback, effectiveness of incentive system of the quality on product internal and external quality and on change of financial performance. Benefit of this research can be used as scientific information regarding the variables of communication level of objectives, frequency of feedback, effectiveness of incentive system of the quality on internal and external quality of product and on change of financial performance of the manufacturing companies in East Java.

Keywords: Communication level of objectives, frequency of feedback, effectiveness of incentive of quality, internal quality and external quality of product, change of financial performance
Background

The business competition in each industry at this era of globalization which increasingly sharply currently, to motivate businessmen give full attention at quality. Full attention at quality will give impact at industrial world in winning business competition. Product quality is important as one of major competitive priorities for attaining a sustainable competitive advantage (Hill, 1997). Failure in the product quality of some firms may have been caused by inability of their control systems to influence production workers to focus their efforts on accomplishing the unit’s product-quality goals (Goold & Quinn, 1993; Young & Selto, 1991) as cited in Maiga and Jacobs (2005). Anthony and Govindarajan (1998) argue that control system of management aim to create field goal congruence which means compatibility creation between perceived self-interest with interest of the organization.

In increasing quality of product and product competitiveness, manufacturing companies in Indonesia in general and in East Java especially, prioritize important to focus to quality. Focus to quality used by companies to access market both of national, international or regional and give protection to customers. Some products related to security, health, safety, and continuity of environment and will be exported or circulated in domestic market. The need to be observed their quality through product certificating process using of Standar Nasional Indonesia (SNI) or other standard confessed by the Institute of Product Certification has been accredited by National Accreditation Committee. Through certifying means company or producer has entitled to use SNI and produced certain products, and present guarantee that the product has fulfilled specified standard.

A good change of financial performance shown by existence of increasing growth in sales, return on sales and return on assets (ROA). Financial performance, which increases, if company is able to act effectively and efficiently. The increasing quality will be able to increase earnings of company. The performance of quality product should affect the external quality indicator of customer satisfaction i.e. complaints, warranty, litigation. A lower percentage of defective products should help a firm to reinforce positive customer experience (Hardie, 1998; Crosby, 1979). Product-quality performance, in term of scrap reduction, rework and defects. Fewer warranty claims decreases the material and labor requires to repair defective products, and a low-cost producer can use its cost advantage to increase profit margin or to lower prices for improved sales (Shetty, 1988). High external product of quality implies high loyalty of current customers. Through improvement of loyalty, customers satisfaction will guarantee earnings in the future (Rush et al., 1995; Fornell, 1992).

Based on the background, this research peeps out some of the problems, which of vital importance to be studied especially for the manufacturing companies. SNI product in East Java related with the problems of management control system consists of communication level of objectives, frequency of feedback, effectiveness of incentive system of the quality that can affect internal quality of the product. Internal quality of product can affect external quality of product and change of financial performance and external quality of product can effect change of financial performance.

Literature Review and Hypothesis

Communication level of objectives of the quality.

Objectives, which have been specified, will affect the workers to make strategy pointing them to goal achievement. Company must settle objectives clearly and challenge which are faced and gives trust to the workers that the objectives are reachable. It will make the workers have a behavior which aims at specific performance objectives, specified by the company.

Eresz and Kanfer (1983) argue that goal setting will heightens motivation. This means that the targets received will strengthen or weaken determined target and will motivate the workers in aiming to the goal achievement.
Practice of manufacturer has been a based process activity of improvement of quality at the workers that has a business and communicates their quality targets. And so, communication of improvement targets of business unit product quality is expected to affect effort direction of the workers to improve quality of their unit product. TQM as new manufacture practice, developed as philosophy which emphasizes thought that process of manufacture with continue to improve, will eliminate waste and improve quality. Shim and Killough (1998), Daniel and Reitsperger (1992) told that manufacture practice has just that TQM will communicates quality target for continuous improvement to affect internal quality of company products. By communicating quality targets in term of cost of scrap, rework and defect will motivate the workers to reach the target. The low of level cost of scrap, rework and defect will make internal quality of high product.

Hypothesis 1: Communication level of objectives of the quality has a positive effect on internal qualities of product.

Frequency of feedbacks of the qualities.

Frequency of feedback of the qualities are frequency that the company evaluates, analyzes, and distribute data of qualities (scrap, rework, defect) to all factory, in able to give direction, motivate and detect for improvement process activity of product quality. So increasingly, company performs evaluation, analysis, and distribution of data of qualities to all factory, then company will be able to improve process of quality which in the end, will obtain internal quality of product which excelsior. Frequency of feedbacks of the qualities will motivate to provide information about worker performance which in the end, will increase clarity of role of duties which must be executed by the workers (Kluger and Denisi, 1996; Early et al., 1990; Bandura, 1986 : 50-51). Researche of behavior of organizational have indicated that feedback-assisted increase behavior with duty orientation (Ashford and Cumming, 1983; Hgen et al., 1979). Kaplan (1983), Howell and Soucy (1987) told that the operation of feedback from time to time and relevance are required to manage quality everyday. Information of qualities like cost of scrap, rework, and defect can give a base to error detection and guidance to improvement areas (Otley and Berry, 1980; Ashford and Tsui, 1991).

Hypothesis 2: Frequency of quality feedbacks have a positive effect on internal qualities of product.

Effectiveness of incentive system of quality.

Classical Utility Theory tells that value to a good is level of satisfaction (utility), which is given by the goods to its user (Jevons, as cited in Medema & Samuels, 2003, p. 418-419) and Goal setting theory tells that every worker ought to have specific performance target to be able to mobilize business. The workers affect strategy to be used to finalize their duty (Desimone, Werner & Harris, 2002; Locke as cited in Gomez-Mejia, Balkin & Cardy, 1995, p. 92-93). Effectiveness of incentive systems of quality are system reward and recognition for both individual and group in attainment of the target consists of scrap, rework and defect as well as for process activity of improvement of product quality. Incentive covers both of finance dimension and non-finance where in which finance referred reward while non-finance there referred recognition. Govindarajan and Gupta (1985) expressed that when reward and recognition packed into specific performance measure, behavior of the workers will lead to desire of to optimize the performance measure.

Hypothesis 3: Effectiveness of incentive systems of quality have a positive effect on internal qualities of product.
Internal qualities of product.

Internal qualities of product are quality of finished good which was assessed before delivery and related to quality of process (Juran & Gyrna, 1993; Garvin, 1987; Crosby, 1979). These can be seen with existence of decrease in internal failure of the qualities consists of scrap, rework, and defect rate and improvement of product reliability level before shipping. Internal qualities of product are collected and distributed to factory to determine what must be paid attention by the workers (Ilgen, Fisher & Taylor, 1979). Dawson and Patrickson (1991), Ahire (1996), Ahire and Dreyfus (2000) used indicator of improvement of quality for 3 years in measuring performance quality of company.

Internal qualities include the ability of a manufacturing plant to produce product conforming to their designed quality at an economic production cost. So, it can be viewed as the “conformance to requirement” dimension of quality as specified by Crosby (1979, 1996). Ahire and Dreyfus (2000) consider five measure of internal quality: scrap rate, rework rate, defect rate, internal reliability test performance before shipping, and manufacturing productivity. The Performance of finished products in final tests and the proportion of defective units of production are widely used indicators of conformance quality at the end of the production process (Crosby, 1979, 1996). The Cost efficiency of a production process is reflected in the scrap and rework generated during production. They represent internal quality failure costs (Juran & Gyrna, 1993). Scrap and rework have been used as appropriate indicator of internal quality (Flynn et al., 1995).

Hypothesis 4: Internal qualities of product have a positive effect on external qualities of product.

Hypothesis 5: Internal qualities of product have a positive effect on Changes of Financial Performance.

External qualities of product.

Ahire and Dreyfus (2000) gave attention focus in four long-range indicators of external quality: warranty works, litigation claims, customer complaints, market share. Warranty, litigation claims, customer complaints refers to the external quality failure costs (Juran, 1993). Market share also has been directly associated with customer perception of a firm’s product of based on recent and past usage (Flynn et al., 1995; Hardie, 1998). Based on support from literature TQM, Dawson and Patrickson (1991), Ahire (1996), Ahire and Dreyfus (2000), they used improvement in these indicators over a 3-year time frame to measure firms’ performance along external quality outcomes. So external qualities is related to the customer’s perspective of the products upon field usage.

Changes of financial performance are ability of company in increasing growth of sale, profitability (return on sales), return on assets (ROA). Growth divided into three major performance aspects that are growth in return on asset, growth in sale, growth in return on sale. Usage of growth as performance measure have fascination in research. In the beginning of the year 1982 when data collected for research of Swamidass and Newell (1987), industries which were used in this research given on to recession condition as well as the height of competition of overseas. ROA not used in research of Swamidass and Newell (1987) related to following reason: industries which were included at their research in general were matured. Many companies which participates in research of Swamidass and Newell (1987) tend to delay new investment in their facilities and prefer to operate with asset with small basis. For companies with very small asset, it will have higher ROA compared to companies with modern facility and larger fixed asset. This can become consideration in measuring performance.

Hypothesis 6: External qualities of product have a positive effect on changes of financial performance.
Methodology

Researcher used survey to collect data from a cross-section of TQM manufacturing factory to aim researcher hypotheses. The population is overall factory or quality managers. A total of 205 manufacturing units were selected and the names of managers were gathered.

Manufacturing business which has SNI (Indonesia National Standard) product in East Java are the subjects of this study. To have subjects’ response, this study employed survey methods by distributing the questionnaires directly to the subjects through census sampling technique.

Validity of the instruments used in this study is assessed through building measurement model. Moreover, reliability will be assessed through composite (construct) reliability by cut off value are minimum 0.7. Finally, to test the hypothesis, this study performs structural equation modelling.

Results and Discussion

Data for the study were obtained from Factory Manager of Manufacturing companies which has SNI product located in East Java up to 2008 are 205 manufacturing companies. Of the 205 questionnaires disseminated, there are 126 which are returned but 19 questionnaires are filled incomplete. Therefore, only 107 are changeable and analysed. The Classification by National Accreditation Committee (Badan Akreditasi Nasional) of Respondents employed in the Manure (16), Mineral Water (15), Salt (12), Pipe
(10), Lamp (9), Steel (7), Wheel (6), cement (4), Instant Noodle (7), Accu (6), Alcohol (5), Aluminium (5), biscuit (5).

To asses validity, this study built measurement model with result shown Tabel 1. Most of the goodness-of-fit statistics have good fit.

This study used Structural Equation Modeling (SEM) to analyze the data. Although other multivariate techniques are known to be powerful in testing single relationship between the dependent and independent variable, human and behavioral issues in management are more complicated, so that one dependent variable may be an independent variable in other dependence relationship (Maiga & Jacob, 2005).

Table 1
Number of Respondents Used in the Study by Organization Type

<table>
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<tr>
<th>Organization Type</th>
<th>Number of Respondents</th>
</tr>
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<td>Manure</td>
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<tr>
<td>Mineral Water</td>
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<tr>
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<td>Lamp</td>
<td>9</td>
</tr>
<tr>
<td>Steel</td>
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<tr>
<td>Instant Noodles</td>
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<td>Wheel</td>
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</tr>
<tr>
<td>Accu</td>
<td>6</td>
</tr>
<tr>
<td>Alcohol</td>
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</tr>
<tr>
<td>Aluminium</td>
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<tr>
<td>Biscuit</td>
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<tr>
<td>Cement</td>
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<td><strong>Total</strong></td>
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Table 2
Reliability

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Table 3

Structural Equation Modeling (SEM): Measurement Model (Regression Weights)

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Table 4
Structural Equation Modeling (SEM): Structural Model (Regression Weights)

<table>
<thead>
<tr>
<th></th>
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<th>P</th>
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<td>.089</td>
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<tr>
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<td>Y2</td>
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<td>.143</td>
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Table 5
Goodness-of-fit

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<td>Significance</td>
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<tr>
<td>Probability</td>
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<tr>
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<tr>
<td>GFI</td>
<td>0.942</td>
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<tr>
<td>CMIN/DF</td>
<td>1.031</td>
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<td>TLI</td>
<td>0.957</td>
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</table>

Based on the result of examination of direct effect, line coefficient indicates that the effect of communication level of objectives of the quality on internal qualities of product has line coefficient of 0.225 with probability 0.003. This can be interpreted that communication level of objectives of the quality has an effect significantly on internal qualities of product.

Target which have been specified, will affect the workers to make strategy point the goal achievement. Company must settle target clearly and challenges which are faced and gives trust to the workers that the target can be achieved. Thereby will make the workers have behavior of which aims at specific performance targets which were specified by the company.

Harrel and Tuttle (2001) expressed that compatibility of individual activities in information system with organizational strategic target are required to comprehend the factors which brings impact to behavior about the information system professionals. What specified by organization will affect behavior of through target, feedback and economic incentive. Communication level of objectives of the quality, which is performed by manufacturing business through manager quality or factory manager, will affect the workers to have behavior of which its pointing to the strategy specified by company in goal achievement. When company settles clearly targets of scrap, rework and defect will make the workers have behavior of aimed at targets which have been specified by company. So by communicating targets of scrap, rework and defect these will affect effort direction of the factory workers to improve product quality of their units and eliminate waste.

Based on the result of examination of direct effect, line coefficient indicates that the effect of frequency of feedback of the quality on internal quality of product has line coefficient of 0.137 with probability 0.030. This produces a finding that frequency of feedbacks of the quality has significant effect.
on internal qualities of product. Based on the result of the examination then it can be concluded that Hypothesis 2 (two) in this study expresses that frequency of feedback of the quality has significant effect on internal qualities of product if proven or supported by fact. This study finding indicates support to the theory which expresses existence of significant effect of frequency of feedback of the quality on internal qualities of product.

Specific feedback will increases performance than feedback which generally, has the character of specific that will give clarity of a role of duty. Specific feedback also gives workers the opportunity to use any good strategy to execute the duty (Early et al., 1990). Ashford and Cumming (1983) expressed research behavior of organizational has indicated that feedback assisted to increase duty orientated behavior. It is mean that by giving feedback to the workers about what have been reached will make the workers have behavior to finalize duty which have been specified by company. Information of qualities like scrap, rework and defect can give a base to error detecting and serve as a guidance to see improvement areas (Ashford & Tsui, 1991; Otley & Berry, 1980).

Based on the result of examination of direct effect, line coefficient indicates that the effect of effectiveness of quality incentive system on internal qualities of product has line coefficient of 1.054 with probability 0.000. This produces a finding that effectiveness of quality incentive system has a significant effect on internal qualities of product. Based on the result of the examination, then it can be summarized that Hypothesis 3 (three) in this study expresses that effectiveness of quality incentive system has an significant effect on internal qualities of product is proven or supported by fact. This study finding indicates support to the theory which expresses existence of significant effect of effectiveness of quality incentive system on internal qualities of product.

This study finding consistent with survey from KPMG Peat Marwick the year 1991 found that 60% organization, which has five years or more experience of TQM in explicit gave reward to the workers for attainment of performance quality of (The Economist, 1992). Spreitzer and Mishra (1999), Ittner and Larcker (1995), expressed that effective of quality incentive system are effectiveness of reward and recognition system which are passed to the workers for improvement, not just for goal achievement and target.

Based on result of the examination of effect line, coefficient directly indicates that influence of internal qualities of product on external qualities of product has line coefficient of 0.603 with probability 0.000. This produces a finding that internal qualities of product has an significant effect to external qualities of product. Based on result of the examination then can be concluded that Hypothesis 4 (four) in this study expresses that internal qualities of product has a significant effect on external qualities of product. It is proven or supported by fact. This study finding indicates support to the theory, which expresses existence of significant effect of internal qualities of product on external qualities of product.

Result of this study supports the research which is performed by Cronin and Taylor (1992) what found causal relation which are positive and strong between quality performance which is proxy with internal qualities of product and customer satisfaction, which is proxy with external qualities of product. Fornel (1992) found in a research, existence of correlation between quality performance which is proxy with internal qualities of product with the customer satisfaction which is proxy with external qualities of product. Internal qualities of product mean of reduction of scrap, rework, and defect will affect external quality of product.

Based on result of the examination of effect line, coefficient directly indicates that effect of internal qualities of product on change of financial performance has line coefficient of 0.193 with probability 0.031. This produces finding that internal qualities of product has a significant effect on change of financial performance. Based on result of the examination, it can be concluded that Hypothesis 5 (five) in this study expresses that internal qualities of product has a significant effect on change of financial performance and is proven or supported by fact. This study finding indicates support to the theory which expresses existence of significant effect of internal qualities of product on change of financial performance.
Result of this study supports the research which is performed by Maiga and Jacobs (2005) expressed that company starts improvement in internal qualities of product if they expected internal qualities of product will increase earnings, bigger than improvements of expense. So degradation level of scrap, level of rework, level of defect and improvement of product reliability level will reduce product cost therefore price becomes competitive. Competitive price will increase sale. Growth of sale will increase earnings.

Based on result of the examination of effect line, coefficient directly indicates that effect of external qualities of product on change of financial performance has line coefficient of 0.372 with probability 0.009. This produces finding that external qualities of product has an significant effect on change of financial performance. Based on result of the examination, it can be concluded that Hypothesis 6 (six) in this study expresses that external qualities of product has a significant effect on change of financial performance and is proven or supported by fact. This study finding indicates support to the theory which expresses existence of effect of external qualities of product on change of financial performance.

Customer satisfaction is customer perception of usage product quality in field (so-called with external quality). External qualities happened with lowering of the warranty claimed, litigation, customer complaint. Quality of external were used as proxy for customer satisfaction because lower of external failure, then customer satisfaction of excelsior (Ahire & Dreyfus, 2000; Shims & Killough, 1998).

Conclusion

Based on analysis of result of this research and discussion about the effect of communication level of objectives, frequency of feedbacks, the effectiveness of incentive systems of the quality on internal and external qualities of product on change of financial performance of manufacturing company in East Java, it can be pulled as conclusion: Communication level of objective of the quality has an effect on internal qualities of product in manufacturing companies. Frequency of quality feedbacks has an effect on internal qualities of product of manufacturing companies. Effectiveness of quality incentive system has an effect on internal qualities of product of manufacturing companies. Internal qualities of product has an effect on external qualities of product of manufacturing companies. Internal qualities of product has an effect on the change of financial performance of manufacturing companies. External qualities of product has an effect on change of financial performance of manufacturing companies.

References


Abstract

The economy of Negros Occidental is generally driven by the sugar industry. This led to the emergence of Negros Occidental as the country’s premiere sugar producer in the 1950’s (Sa-onoy, 2003). With the downfall of the sugar industry in mid-1970’s, Negrenses were adversely affected and thousands of sugar workers were displaced. Today, the growing number of entrepreneurs in Negros Occidental assures province’s economic capacity to alleviate poverty. This investigation was done to look into the culture of selected Negrense entrepreneurs and find out the practices, traditions, beliefs and values contributing to their success. The influence of internal and external environments on their business operations was also determined. Participants for this study were the active members of the Association of Negros Producers (ANP) and the beneficiaries of Negros Economic Development Foundation (NEDF) Projects. Using a self-made questionnaire, findings revealed that financial betterment is the common reason for becoming entrepreneurs and the most common success indicator is additional income for the family. The research contributes to the understanding of the complex operations of entrepreneurial ventures. The updating and continuous education of these entrepreneurs should be encouraged and sustained through the support of the local government and other concerned organizations.

Keywords: culture, entrepreneurs, management, development
Background

The customs of society and their culture are the things that make it different from other societies. The American Heritage Dictionary defines culture as the totality of socially transmitted behavior patterns, arts, beliefs, institutions, and all other products of human work and thought. It further states that culture is powerfully subjective and reflects the meanings and understandings that we typically attribute to situations that we apply to common problems.

Culture shows the way things get done in a community. It is a phenomenon that surrounds the organization. This statement affirms Schein’s (2000) statement that “culture defines leadership”. More specifically, for an organizational culture, national and even regional and provincial cultures are important influences. Stakeholders of the organization bring their own individual beliefs, experiences and values.

Moreover, work-groups have their own interactions and behaviors which also affect the organization whether it is a corporation, partnership or sole proprietorship. These work groups of various business organizations drive the economy of a particular place.

The economy of Negros Occidental is generally driven by the sugar industry. The phenomenal development of the sugar industry led to the emergence of Negros Occidental as the country’s premiere sugar producer (Philippine’s sugar bowl) as early as the 1950’s. With the downfall of the sugar industry in mid-1970’s, Negrenses were adversely affected. Thousands of sugar workers were displaced. Economic depression was widespread in the province; financial crisis was a threat everywhere and already a fact in more than half of the towns and cities in the province. Aggravating the situation is the regional crisis in Asia and the peso devaluation coupled by the ever-increasing foreign debt of the country. In the 1980’s, the world’s attention was even caught by the program ‘Save Negros’ with Freddie Aguilar (Filipino folk singer) raising funds through his performances featuring one of his songs entitled “Sagipin Natin Ang Mga Bata Sa Negros”. Financial and material aids were coming in but government officials realized that Negros should not just depend on foreign aid as this will definitely not last long. Several solutions were tried and attempts to alleviate poverty were made.

Diversification was among the alternatives. However, the prawn and golden applesnail industry introduced in the province were not successful. Thus, the government pushed for entrepreneurship and included it in priority programs as early as in the 1980s.

The Entrepreneurship Center at Miami University of Ohio states that entrepreneurship is the process of identifying, developing and bringing a vision to life. The vision may be an innovative idea, an opportunity, or simply a better way to do something. The end result of this process is the creation of a new venture, formed under conditions of risk and considerable uncertainty. Fajardo (1994) states that a free enterprise or market economy is an entrepreneurship economy. This is an economy dominated by entrepreneurs. Fajardo added that one of the main thrusts of the national government is the creation of the spirit of entrepreneurship among the poor.

Efforts were made by the provincial government to attract people to entrepreneurship as the Philippine Educational System is geared toward corporate employment. Enculturation efforts were made at several levels: in schools where entrepreneurship is incorporated in the basic education curriculum, in various enterprises, at the political level where local government officials were tapped and the level of civil society where non-government organizations as well as people’s organizations were involved.

With the growing number of entrepreneurs in Negros Occidental, Negrenses hope that the province’s economy will improve and poverty will be alleviated through their contribution. There is therefore a need to assess and to look closely on the practices, characteristics and values of entrepreneurs as contributors to the sustainable development in the province. This need prompted the researcher to conduct the investigation so as to come up with recommendations for the government and non-government organizations as to how they can assist entrepreneurs for the sustainable development of their ventures.
Objectives of the Study

This study looked into the culture of Negrense entrepreneurs to find out which practices, characteristics and values greatly contribute to a sustainable enterprise development in Negros Occidental. Specifically, answers to the following questions were sought:

1. What is the profile of Negrense Entrepreneurs in terms of:
   1.1 Demographics: gender, civil status, birth order, educational background, and parents’ educational background and occupation
   1.2 Business Profile: number of years in business, type of business, source of capitalization, location of business and mode of production
2. What are the common reasons for respondents becoming entrepreneurs? To what extent have these reasons influenced their entry in the business?
3. What are the common indicators of success of Negrense entrepreneurs?
4. To what extent do Negrense entrepreneurs consider the following factors to have greatly contributed to their success:
   4.1 Personal practices, characteristics and values
   4.2 Business planning and strategies
   4.3 People management
   4.4 Operations management
   4.5 Financial Management
   4.6 Marketing management
   4.7 External Factors (economic, technological, socio-cultural and political-legal)
5. Is there a significant difference in the degree of influence of the aforementioned factors to the entrepreneurs’ business when they are classified according to type of business?

Hypotheses

The culture of entrepreneurs contributes to the sustainable enterprise development in Negros Occidental. Statistically, the researcher hypothesized that there is no significant difference in the degree of influence of the various factors to the Negrense entrepreneurs’ business when they are classified according to type of business.

Theoretical Framework

Entrepreneurship is considered as an important factor in the socio-economic development of a society. Sorolla and Sorolla (1996) affirm this when they said “to be an entrepreneur is to be productive in order to contribute to the growth of society. When members of the community practice entrepreneurship, economic development takes place rapidly.” They include in their list the following benefits of entrepreneurship to society: entrepreneurship creates employment, improves the quality of life, contributes to more equitable distribution of income, utilizes and mobilizes resources for national productivity and brings social benefits through the government. Mallo (2000) also claims that “among the significant sectors in our society that can play a vital role towards national development are the entrepreneurs.”

Joseph Schumpeter was among the first to lay out a clear concept of entrepreneurship. He distinguished inventions from the entrepreneur’s innovations. He pointed out that entrepreneurs innovate, not just by figuring out how to use inventions, but also by introducing new means of production, new products, new forms of organization. He argued that these innovations take just as much skill and daring as does the process of invention. Schumpeter who argued that: “Innovation by entrepreneur led to gales
of ‘creative destruction’ as innovations cased old inventories, ideas, technologies, skills and equipment to become obsolete” (Liberty Fund Inc., 2008).

Figure 1. Framework of the Study

From the above premise, this paper determined the extent to which the organizational culture and practices of Negrense entrepreneurs affect business operations. It considered the following: characteristics, values and practices in the five areas of business management (business planning and strategies, people, marketing, operations and finance). It looked into the prevailing culture of Negrense entrepreneurs, their reasons for becoming entrepreneurs, success indicators and the factors that influenced their success as entrepreneurs. In establishing the extent of influence of various factors on the success of these entrepreneurs, understanding of the concept of practices, characteristics and values are important. Practices in this investigation refer to what the entrepreneurs are doing as they manage their business. As defined (Farlex, 2008) practices are habitual or customary actions/way of doing something.

Characteristics are descriptors of the personal character of the entrepreneurs. Farlex (2008) defines characteristics as a feature that helps identify, tell apart, describe recognizably, in short, a distinguishing mark or trait of a person or thing. Values refer to the rule or standard of good behavior or
the principles of right and wrong that are accepted by an individual or social group (Farlex, 2008). This is the basis of defining values in this study. The context of influences in the internal business operations is divided into five areas, namely: business planning/strategies, human resources, production management, financial management, and marketing management. This investigation determines the extent to which such factors affected the entrepreneurs’ success. The context of external business environment is divided into four, namely: economic, technological, socio-cultural and political-legal aspects. This study looked into the extent to which the aforementioned factors affected or influenced the entrepreneurs’ business success.

Although Ahmed and McQuaid (2005) claim that various perspectives have different implications for how entrepreneurship is related to and can help promote sustainable development, the ultimate goal of the researcher is to come up with recommendations for the government and non-government organizations as to how they can assist entrepreneurs on sustainable development of their ventures.

Methodology

The study covered the entire population of 77 active members of the ANP and 52 producers with at least 10 employees who were assisted by the NEDF were surveyed using a questionnaire purposely made for this study. These entrepreneurs are geographically dispersed in the cities of Bacolod, Talisay and Silay and in the municipality of Valladolid, all located in the central part of Negros Occidental. The responses were tabulated using Microsoft Excel and analyzed using frequency, percentage, mean and one-way analysis of variance.

Results and Discussion

Demographics

There are more male (76=58.9%) Negrense Entrepreneurs than female (53 =41.09%). Minniti, Allen and Langowitz (2006) claimed that regardless of country, men are more likely to be involved in entrepreneurial activity than women. However, this was not the situation in Negros as Billig (1994) pointed out that the earliest and still most successful wave of young entrepreneurs in Negros were women and Al-Owaihan and Rao (2010) claim that women entrepreneurs make significant contribution to the socio-economic development of both developed and developing countries.

Along marital status, 76% are married and this is affirmed in the Survey and Empirical Analysis of Small Scale Enterprises in the Philippines (2007).

Most entrepreneurs (52%) are middle children while 17% are eldest in the family who became entrepreneurs. Only 2% are youngest in their family. This result does not necessarily affirm the Filipino’s practice that the eldest child assumes the responsibility of helping their parents support the family’s living.

College level (32%) is the dominant educational attainment of Negrense Entrepreneurs. The college graduates who became entrepreneurs can be viewed from the perspective that they want to express themselves as artist-designers while earning a living. Thirty-five of them were graduates of Bachelor of Fine Arts major in Industrial Design. This result affirmed Roffey’s (2000) statement that Filipino entrepreneurs scanned for new opportunities. They were not able to spot good opportunities for employment so they were more watchful of business opportunities.

Twenty-two percent of the respondents’ father have completed elementary education and 16% have reached elementary level. Thirty-four percent indicated that their fathers are in business, 20 (15.50%) mentioned that their fathers are employed. Twenty-four (18.60%) mothers of the entrepreneurs are in the elementary level. Twenty (15.50%) indicated that their mothers are in business.
Having entrepreneurial role models is seen not only as an important motivator, but also as an intangible structural feature for entrepreneurship (Lee, Wong, Chua & Chen 2005).

Business Profile

Majority (61%) have longer period of business operations. Fifty-one percent of the respondents are into manufacturing of goods or preservation of vegetable and poultry products. Twenty-seven (20.93%) entrepreneurs are into trading. Forty-seven (36.43%) got their capital from savings while 48 (37.21%) sourced funds from loans. Twelve (9.30%) got their capital from both savings and loans. Forty-six percent operate backyard business and as members of the Association of Negros Producers display their products at the Negros Showroom. Twenty-eight percent have a store in commercial area. Five operate their business in the industrial area. Despite of modern technology, only 3% observe machine-intensive production, 68% have labor-intensive and 11% combine both labor- and machine-intensive production.

Common Reasons for Becoming Entrepreneurs

Majority (89) became entrepreneurs because they aim for financial betterment. Independence comes next (69) as a motivating factor for their being entrepreneurs. These are followed by best use of expertise, to improve social status and greater control of life. Lowest three reasons are: discrimination, salaried work was underpaid and could not find salaried work. The Survey and Empirical Analysis of Small-Scale Enterprises in the Philippines revealed that 64% said that they originated them, 19% inherited them, and 16% purchased them believing that their own business will be a source of higher income and financial security for them and their families; offers them a more flexible/manageable schedule between family and work life (The Gale Group, 2008).

Common Success Indicators

The top three success indicators are: additional income for the family (rank 1), followed by personal satisfaction (rank 2) and continued operation of the business for a long period of time and customer satisfaction both rank 3.5. The lowest three indicators are: above standard liquidity and solvency of the business, contributing to the income of the government and increasing trend of annual ROI. Go (2002) affirms this by saying “entrepreneurship is a source of residual income in the Philippines.”

Extent of Influence of Personal Practices, Characteristics and Values on Entrepreneurs’ Business Success

Personal practices.

Most influential in the business success is familism/close family ties (mean = 3.710) indicating a great influence. This is followed by bayanihan system (mean = 3.673) and pakikisama (3.515), both indicate a great influence. Having the least influence on their business’ success are ‘bahala na’ or fatalistic attitude (mean=1.902), ‘leads by kulit’(mean=1.987) and ‘ningas kugon’(mean=2.000), all indicating a minimal influence. The over-all extent of influence of personal practices on their business success is moderate (mean= 2.654).
Personal characteristics.

The three most influential personal characteristics of the entrepreneurs on their business success are hardworking (mean = 4.397), initiative (mean = 4.230) and self-confidence (mean = 4.205). These characteristics indicate a very great influence on their business success. Personal characteristics of the entrepreneurs with the least influence on their business success are: gregarious (mean = 3.568), frugality (mean = 3.624) and endurance (mean = 3.752), all having a great influence. Over-all, the entrepreneurs’ personal characteristics have a great influence (mean = 3.925) on their business success. Some entrepreneurs indicated that their personal characteristics have not influenced their business success. Out of 16 characteristics only four have not influenced their business. These are: creativity (rank 1), achievement-oriented (rank 2), frugality and leadership (rank 3.5). It is also interesting to note that 12 out of 16 personal characteristics listed have not influenced their business success.

Personal values.

The personal values of the entrepreneurs have a great influence (mean = 4.032) on the success of their business. Out of 16 personal values listed, four have very great influence, these are: loyalty (rank 1; mean = 4.387), responsibility (rank 2; mean = 4.358), truth (rank 3; mean = 4.233) and respect (rank 4; mean = 4.227). Eleven personal values have a great influence while only one has a moderate influence on their business success. Personal values with the least influence are: collegiality (mean = 3.333), humility (mean = 3.876) and compassion (mean = 3.882). Over-all, the entrepreneurs’ personal values have a great influence (mean = 4.032). Prather (1998) affirms this when she cited one Filipino woman entrepreneur she featured in her article who uses “Filipino Management” which include practices attuned with Filipino values adapted to Western culture. Forming and maintaining relationships, a strength of Filipino culture and the discipline required in Western business are both heavily weighted.

Extent of Influence of Internal Business Operations on the Success of the Entrepreneurs’ Business

Business planning and strategies.

Business planning and strategies has a moderate influence on their business success. Two out of four factors have a great influence on their business. These are: availability of long-range and short-range business plans (mean = 3.461) and open communication line with employees (mean = 3.505). Regular monitoring system and employees’ performance evaluation has a moderate influence (mean = 2.989) while clearly defined structure (mean = 2.511) has a minimal influence. Over-all, business planning and strategies has a moderate influence (mean = 3.116).

People management.

Good interpersonal relationship among workers is the only factor with a great influence (mean = 3.417) on their business success. Majority (7 out of 10) of the factors have moderate influence on their success. Only one has minimal influence (hiring relatives; mean = 2.344). Absence of labor union has negligible influence (mean = 1.535). Over-all influence of people management is moderate (mean = 2.834).

Operations management.

The great influence of good supplier relationship (mean = 3.573) is the highest among ten factors under operations management. The other nine factors have moderate influence on their business success
Financial management.

Three factors have great influence on their business success in terms of financial management. These are: availability of funds (mean=3.426), efficient cash management (mean=3.505) and proper utilization of funds (mean=3.561). Observance of entity concept has a moderate influence (mean = 2.793). The over-all influence of financial management is moderate (mean=3.321).

Marketing management.

Customer relations (mean=3.576) is the only factor with a great influence on their business success. Only market research has a minimal influence (mean = 2.452). The remaining six factors have moderate influence with mean scores between 2.258 and 3.209. The over-all influence of marketing management on the entrepreneurs’ success is moderate (mean = 3.056).

Over-all influence of internal business environment.

Among the five components, people management got the lowest mean (2.834) while business planning and strategies recorded the highest mean (3.116). However, there is no marked difference in the influence of these components as all five have moderate influence. The over-all influence of the internal environment on the Negrense entrepreneurs’ business is moderate (mean =3.072).

Extent of Influence of External Business Operations on the Success of the Entrepreneurs’ Business

Economic environment.

Out of the six identified factors in this environment, one (trade liberalization-AFTA & GATT) has minimal influence with a mean score of 2.258. The other five factors have moderate influence with mean between 2.075 and 3.209, resulting to an over-all mean score of 2.853. Abundance of resources got the highest mean (3.209) indicating a moderate influence. Role models are one of the many intangibles that provide sufficient conditions for entrepreneurship to thrive in a locality (Lee, Wong, Chua & Chen 2005).

Technological environment.

The four factors which fall under the technological environment all indicate a moderate influence with mean scores between 2.658 and 3.080. The use of computer and internet has the lowest mean score while communication facilities has the highest mean score. Over-all influence is moderate (mean =2.835). Davies’ (2007) article ‘Creating Knowledge Entrepreneurs’ is not consistent with the findings of this study as he articulated that the knowledge culture develops knowledge entrepreneurs who create and improve output for the customer. Moreover, results prove that majority of the Negrense entrepreneurs still need an additional training on the use of technology and, more specifically the efficient use of computers for product development.
Socio-cultural environment.

Socio-cultural environment has a great influence on their business’ success. However, three factors, namely, anticipation of the future, family traditions and religious practices revealed a moderate influence with mean scores between 3.033 and 3.437. Of the six factors, family traditions ranked first, followed by religious practices and culture of competition. Anticipation of the future, attitude of clients and customer preferences were the lowest.

Political-legal environment.

The four political-legal factors have moderate influence on their business success. Peace and order got the highest mean (2.676) while local investment incentives got the lowest (2.095). Similar to the Philippines, the government of India has attempted to create conducive environment for entrepreneurs and make the proposition for entrepreneurship attractive by providing support in three formats; (1) government policies favoring promotion of entrepreneurial activity; (2) making financial support available; and (3) setting up of academic or institutional support for imparting entrepreneurial and business skills. Similarly, in China multi-pronged strategies for promoting SMEs have been formulated by the government (Goel, Vohra, Zhang & Arora, 2007).

Over-all external environment.

Only the socio-cultural environment showed a great influence (mean=3.437). The economic (mean=2.853), technological (mean=2.835) and political-legal (mean=2.273) environment had moderate influence. Overall, the findings of this study are not consistent with the study of Papzan et.al. (2008) in that internal and external factors (at different levels) are strong predictors of entrepreneurs’ success. An individual who perceives business opportunities is said to be in a state of heightened awareness for information, a condition known as “entrepreneurial alertness”. During this state, individuals are highly sensitive towards changes in the business environment, be it political, economic, social or technological environment, which provide them cues of unmet needs in the market (Lee, Wong, Chua & Chen, 2005).

Significance of the Difference in the Degree of Influence of Internal and External Business Environment to the Entrepreneurs’ Success

Grouping the entrepreneurs according to type of business and comparing the degree of influence of the aforementioned factors, it is interesting to note that of the three clusters of factors, i.e. personal, internal business and external business, only the economic environment has significant influence on the entrepreneurs’ success when they are grouped according to type of business.

Being Filipinos and Negrenses, the entrepreneurs’ personal practices, characteristics and values do not significantly vary regardless of the type of their business. The internal business operations as well as technological, socio-cultural and political-legal environment also do not significantly vary when the entrepreneurs were grouped according to type of their business.

Similar government policies and incentive schemes for entrepreneurs or small and medium enterprises may also have contributed to the influences of both internal and external factors on the success of the entrepreneurs.
Table 1
*Significance of the Difference in the Degree of Influence of Identified Factors on the Success of Their Business When They are Grouped According to Type of Business*

<table>
<thead>
<tr>
<th>Factors</th>
<th>P-Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Practices</td>
<td>0.00527</td>
<td>Not significant</td>
</tr>
<tr>
<td>Personal Characteristics</td>
<td>0.00715</td>
<td></td>
</tr>
<tr>
<td>Personal Values</td>
<td>0.00122</td>
<td></td>
</tr>
<tr>
<td>Internal Business Environment</td>
<td>0.00740</td>
<td></td>
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<tr>
<td>Business Planning and Strategies</td>
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<td>Not significant</td>
</tr>
<tr>
<td>People Management</td>
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<tr>
<td>Operations Management</td>
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</tr>
<tr>
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<tr>
<td>Socio-cultural Environment</td>
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<td>Not significant</td>
</tr>
<tr>
<td>Political-Legal Environment</td>
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<td></td>
</tr>
<tr>
<td>Over-all External Environment</td>
<td>0.01644</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

Negrense entrepreneurs are predominantly male, married, eldest and have reached college. They are into backyard labor intensive manufacturing business for a longer period of time and got their capitalization either from savings or loans. It does not therefore require one to acquire expensive machineries and big industrial space to be an entrepreneur. The traditional belief that parents need to be able to fully finance their children’s education and attend to the welfare of the family are driving forces that led to appreciation of profit and financial betterment brought about by entrepreneurship.

The most common reason for becoming entrepreneurs is financial betterment while the most common success indicator is additional income for the family. The entrepreneurs’ personal characteristics, values and socio-cultural factors in the external business environment have a great influence in the success of their business. Being in business leads to better financial condition. Moreover, independence or wanting to do something they love and have more flexibility are two non-financial indicators of the entrepreneurs’ business success similar to the report in CIBC’s Secrets to Small Business Success (2009).

The entrepreneurs’ personal practices, internal and external business environment moderately influenced their business operations. Entrepreneurship provides a rich and unique experience that leads to professional and personal growth, which can be viewed as measures of success. The degree of influence of personal practices, characteristics, values, internal and external business environment on the business success of Negrense entrepreneurs do not significantly vary. However, looking into the components of the external environment, is economic environment where the degree of influence significantly varies. Over-all, internal and external factors are predictors of entrepreneurs’ success. The government should be aware of it if it is to increase motivation of becoming entrepreneurs.
Recommendation

In support to entrepreneurship in Negros Occidental, it is recommended that government and other concerned organizations shall prepare a program to train and enhance the entrepreneurial and business skills of the entrepreneurs since it was found out that majority of them have lower educational background, either elementary level or elementary graduates only. Possible training modules that may be developed are: Dealing with Cultural Differences; Social Entrepreneurship; and Key for Successful Entrepreneurial Ventures among others.

Since these entrepreneurs contribute to our economic development, government support programs for the entrepreneurs should be designed more particularly in marketing their products in the domestic and foreign markets. The government can also show support to the entrepreneurs by developing incentive schemes, both financial and non-financial, for these entrepreneurs. Lastly, a Provincial Entrepreneurship Monitor can be organized to periodically conduct provincial entrepreneurial assessment in terms of Total Entrepreneurship Activity.

References


Study on Neo-Confucian Entrepreneurs and their Spirits"*

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Abstract

For thousands of years since Pre-Qin Dynasty, Confucianism and entrepreneurs have complex relations, and Confucian entrepreneurs have been rewarded as moral, literate, and good at business and management. It is necessary to look for the essence of traditional Confucian entrepreneurs, and combine it with the features of modern market economy to shape the spirits of Neo-Confucian entrepreneurs in the process of globalization and the development of the socialist market economy. Neo-Confucian entrepreneurs’ spirits are the essence of Confucianism and traditional culture combining the business concept and the spirit of contemporary market economy. They should pay attention to these points: First, making use of Neo-Confucian entrepreneurs as guidance in making decisions. Secondly, the use of Neo-Confucian entrepreneurs values in solving business problems. Thirdly, strengthening the Neo-Confucian entrepreneurs’ spirits and behavior with the new experiment and investigation. Entrepreneurs with Chinese characteristics should be developed to promote the sound development of the economy and building of a harmonious society. Our Business School is directed with the new spirit of "integrity, erudition, dedication, innovation", setting the goal of developing "adaptation to globalization and market economy " with focus on qualified personnel training. "Neo-Confucian entrepreneurs Project" has been actively implemented and has achieved good results.

Keywords: Neo-Confucian entrepreneurs, spirits of Neo-Confucian entrepreneurs, market economy, implication of Neo-Confucian entrepreneurs’ spirits

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Background

In the long river of Chinese culture, “Confucian” and “entrepreneurs” had already been existing during the Pre-Chin Period, when the morally wise entrepreneurs were called “honest entrepreneurs” or “incorrupt entrepreneurs”. However, with the implementation of agricultural politics, stressing agriculture and restraining commerce, in the Western Han dynasty, such concepts and guidelines were gradually formed which were: Confucians were learned and accomplished gentlemen with high moral character, while entrepreneurs were morally reprehensible, chasing profits’, and “Either being Confucian or being Entrepreneur” became the infallible laws of feudal dynasties in China ever since.

After the mid Ming Dynasty, with the appearance of capitalism shoot and the development of Western learning spreading to the east, a large number of entrepreneurs gradually emerged, some of whom switched from Confucian to entrepreneurs, or from entrepreneurs to Confucian. And they consciously combined the Confucian moral and ethical concepts with the industry and commerce.

After China entered the semi-colonial and semi-feudal society in the modern times, a large number of national industrial and commercial entrepreneurs emerged answering the call to saving the nation by the industry. Their business principle highlighted the Confucian moral values and life axiology, cared about creating the harmonious interpersonal relationships, and attached great importance to honest and self-contained personal morality. In the light of the spirit of the times and demands of modern industry and commerce, they remodeled and rectified traditional morality. They advocated modern scientific management which laid the solid foundation of contemporary business management.

With the deepening of reform and opening-up since the 1980s, vastly larger intelligentsias plunge into the commercial sea, and a lot of intellectual capitalists appeared with the rapid development of high-tech enterprises. They absorbed lots of life wisdom and the managing way from traditional Chinese culture, especially Confucian culture, and have made remarkable achievements in the international market. Their personal temperament, charisma and thinking mode possess Confucian marks at varying degrees as well. Their tips for successful business are due to traditional Chinese culture, especially Confucian culture, and they are praised as Neo-Confucian entrepreneurs. Neo-Confucian entrepreneurs’ concept was brought forth as a hot issue in modern society.

With the changes in the proportion of the private economy and state-owned economy since the advent of reform and openness, the Chinese business and culture broke free from all shackles and chains sharply. The old commercial game without rules was gradually replaced by a new and orderly game. Confucianism and entrepreneurs have gained new freedom as well. Neo-Confucian entrepreneurs are the outcome in the new era of globalization wave and new economy springs up, which will enable Chinese market economy to develop soundly and rapidly.

The Era Meaning of Remolding Neo-Confucian Entrepreneurs’ Spirit

Neo-Confucian entrepreneurs’ spirit contains many valuable meanings. In the new century, China is busy with constructing socialist market economy with Chinese characteristics, and such spirit will play a positive role in the market economy.

The honesty and credit of Neo-Confucian entrepreneurs’ spirit promote and rule China’s market economy as an important force. Since the reform and openness, China’s economic development has indeed made remarkable achievements. But at the same time, as the economy develops, the market economy has also brought some negative issues to society such as overwhelming egoism and mammonism, lack of moral and behavior standardization, and crisis of ideals and beliefs etc. All of these call for the recreation of the Neo-Confucian entrepreneurs’ spirit. The main feature of the Neo-Confucian entrepreneurs’ spirit is the rationalism of “Taking advantage by righteousness”, in which righteousness means justice and reasonableness. According to the spirits, modern Confucian entrepreneurs are the main...
body of the rational market economy. The moral codes of Confucian entrepreneurs are “Taking advantage by righteousness” and “Credit fundamentality”, which are principles ensuring the healthy development of the market economy, the harmony of economic development and social progress. Besides, the spirit also encourage people to correctly understand and handle the relationship between profit and righteousness, the individual interests and community interests, business and personhood. By this way, the disordering phenomenon existing in the market economy development could be regulated, and the negative impact from market development could be inhibited, thus the healthy and steady development of the market economy could be ensured.

Neo-Confucian entrepreneurs’ spirit breeds Chinese unique entrepreneurs’ ship, and are the cultural source of the great rejuvenation of the Chinese nation. For the Chinese nation, the 21st century is the era to achieve modernization towards a comprehensive revitalization, the era of the Chinese nation’s rejuvenation. Then, in such great cause, the Confucian entrepreneurs’ spirit as the soul of market economy will play a major spiritual impetus to the revitalization of the Chinese nation’s strong economic momentum. First of all, China’s economy will be internationalized, in which Confucian entrepreneurs play the role of Economic Ambassador. Secondly, Confucian entrepreneurs possess the striving spirit of arduous struggles, the enterprising spirit of ceaseless self-improvement, and the innovating spirit of “Keeping pace with the times”. They will offer the quality products and service to the community, and make the real contribution for economic growth and prosperity and for the realization of modernization. Finally, the Confucian entrepreneurs abroad will also provide active positive support. It can be concluded that the Confucian entrepreneurs and their spirit are not only the pride of the 21st century, but also the pioneers of revitalizing Chinese national economy.

Neo-Confucian entrepreneurs’ spirit are the intellectual impetus building harmonious society and realizing common prosperity. The developing direction of the world economy in the 21st century is to realize socialist market economy. The socialist market’s goal is different from that of capitalist market economy, which is to achieve the common prosperity of the whole society and the prosperity of all ethnic groups instead of creating a small number people possessing great wealth. This requires that, when driving for the individual interests in market activities, we should hold the value orientation of devotion to the state, to the nationality, and even to all of humanity. Based on Confucian’s thought of “Benevolence means loving your fellow-men”, the contemporary Confucian entrepreneurs should have the aspirations of dedicating to the country and struggling to revitalize the national economy, and they also should have the dedication such as dying a martyr for a noble cause, and “Giving up their lives for the sake of their principles” to realize their social ambition. In this respect, the Confucian’s spirit of “Helping the public by bestowing liberally” will help us go beyond the individual's restrictions, and form the value of realizing the common prosperity for the state, for the nationality, and even for the humanity.

The core of Neo-Confucian entrepreneurs’ spirit is benevolence, which is the theoretical basis of the sustainable development strategy. In the 21st century, peace and development remain the mainstream of the times. It is the universal understanding of the global economy to cooperate and compete at the economic field for achieving its own development for peace and equal environment. Confucian entrepreneurs’ spirit are the pillar of peace and development at the economic field in the new century. Confucian entrepreneurs’ spirit are of distinctive pacifism nature. they stand for “Harmony is to be cherished” and “Compete under harmony”. They emphasize that competition should be equal and just, and also are good at promoting just and peaceful economic cooperation and competition. This fits the trend of peace and development in the 21st century. By the Confucian entrepreneurs’ spirit of pacifism, the world economy will be standardized, and the global economy will be co-existing and prosperous.
Main Content Systems of Neo-Confucian Entrepreneurs’ Spirits

Confucian thought is long standing and well-established, which has a lineal descent through more than 2000 years, and forms the unique Chinese manner of thinking and behaving. Confucian spirit integrate Confucianism with business, and then infiltrate and sublimate from business. There are many ideas and wisdom in the Confucian classics. The Analects say, “If the attainment of wealth was guaranteed in its seeking, even if I were to become a groom with a whip in hand to get it, I would do so”. It can clearly be seen that Confucianism is not merely making profits, but thinks that “wealth and honors that one possesses in the midst of injustice are like floating clouds”. In essence, it is against the heartless rich, and stresses making profit by righteousness. It may also be said that Confucian entrepreneurs are engaged in the purely utilitarian business with super-utilitarian morality. Thus, business has pronounced morality color, which is one of the typical business philosophies. The so-called Confucian entrepreneurs mean the entrepreneurs with the spirit, the tolerance and the ethics of Confucianism; they make the Confucian moral ideal and chase the criterion for going into business, and constant virtues (which are benevolence, righteousness, propriety, wisdom, and fidelity) are penetrated into the commercial practice.

In the early 80’s of last century, the Swedish scientist Dr. Hannes Alfven said, “If human beings want to live in peace and prosperity in the 21st century, they must look back 2500 years and seek the wisdom of Confucius”. Four Little Dragons of Asia emerge and make people begin to think of the possibility of integrating the essence of Eastern philosophy, especially Confucian thought, into enterprise management. However, it is the Japanese enterprise community who introduced Chinese Confucian thought into management earlier. And Konosuke Matsushita is one of the representatives who advocate that benevolence is to love others. In China, Harie r Group is one of the enterprises that apply Confucianism successfully. In the 1980s, Zhang Ruimin took the lead in smashing 76 defective refrigerator, and this embodied the responsible attitude towards the consumers, which is in fact righteousness and trust.

Today, the spirit of Neo-Confucian entrepreneurs base on the constant virtues, integrate the core values and beliefs in order to adapt to globalization and socialist market economy formed by the competition, democracy and legal system in the modern market economy. These concern the spirits below: enterprising spirit, respect-work spirit, community spirit, integrity spirit, and self-discipline spirit. Neo-Confucian spirits’ composition system is shown in Figure 1.
Enterprising Spirit

Confucius said, “If the attainment of wealth was guaranteed in its seeking, even if I were to become a groom with a whip in hand to get it, I would do so”. The enterprising spirit caused by the benefit is still the spiritual power for modern businessmen to engage in fierce business battle. The Neo-Confucian entrepreneurs’ enterprising spirit embodies the spirit of “as Heaven’s movement is ever
vigorous, so must a gentleman ceaselessly strive along”, which means sizing up the situation, pioneering for progress, taking the bull by the horns and constantly striving to strengthen themselves.

**Respect-work Spirit**

*Jing* is one of the basic categories of Confucian philosophy. Confucius claims that men should be diligent and assiduous throughout their lives. He said, “Do things devotedly”, “Think things devotedly”, “Cultivate themselves”. Cheng Yi of the Northern Song Dynasty, further insisted, “The so-called *Jing* means concentrated, which is not distracting in doing”. Obviously, *Jing* is a kind of single-minded spiritual status. And showing *Jing* to the work is Chinese traditional virtue. As we know, according to the traditional concept, it places more emphasis on Confucianism than business, thus the Scholar is kept in top-rate and commerce is kept at the bottom of the four social strata. Modern businessmen consider that business is as important as the scholar, farming and craft, which should be respected equally. Based on this spirit, Chinese modern businessmen possess the virtue of attendance, assiduity and carefulness, which promote the success possibility.

**Community Spirit**

*Zhe* business, *Jin* business and *Hui* business stressed on the wisdom of crowd in the business activities without exception. They stuck together by the village friendship of patriarchal society. By the associations and worshipping Lord Kuan, they enhanced mutual understanding. By personal loyalty and helping each other, the relationship between firms is coordinated, and the interpersonal contradiction is eliminated; thus, all sizes of business groups are formed. The community spirit of modern businessmen is reflected mainly in such aspects as caring collectives, being of one mind, staying together, coexistence and co-prosperity, etc.

**Integrity Spirit**

The Confucian spirit should consist of business ethics as trustworthy, sincere, righteous, taking generous and so on, which puts ethics as the constant virtue into the business management. There is a debate about good human nature and evil human nature in Confucian classics. It promotes to keep the good human nature in business, and transforms the human virtue, such as honesty, trustworthiness, loyalty, justice and so on, into excellent business characters and become conscious activity. Modern businessmen’s integrity spirit lies in the honesty, caring for justice above material gains, fair competition and so on.

**Self-discipline Spirit**

Confucian spirit promotes self-discipline rather than heteronomy, and resists the instinct of acquisitiveness by moral self-discipline. Throughout the ages, a large number of Confucian entrepreneurs with sublime business ethics and extraordinary performance prove that Confucianism and commerce can be in one. By means of promoting ethics and arousing people’s moral consciousness, Confucianism cultivates virtue and remedies the ills of the community. Thus, Confucianism is essentially moral order learning, paying particular attention to maintain social order by moral force, and helps people seeking spiritual consciousness. Today, Confucian entrepreneurs’ spirits advocate business ethics which includes the harmonious development between man and nature, the harmonious coexistence among people, the harmony and unity of righteousness and profit, cooperation and competition, self-renewal and self-discipline, and all of these have a strong sense of the times.
Neo-Confucian Entrepreneurs' Spirits and Their Application

Confucian entrepreneurs' spirits and their culture are the spirit of "Mind" philosophy, which is its fundamental spiritual side. They are derived from thinking and self-insight through intuition instead of practical summary and rational reasoning, which are different from experiential knowledge. Neo-Confucian entrepreneurs' spirit application is the process of "spirit" and "material" interaction. It not only creates and accesses to the "material wealth" but also "spiritual wealth". According to psychological knowledge, knowledge usage generally is of four processes: (1) decision-making; (2) solving the problem; (3) experimental exploration; (4) investigation. And it is the same to the application and its usage of knowledge of Neo-Confucian entrepreneurs’ spirits.

Guiding decision-making by the Neo-Confucian entrepreneurs’ spirit.

Decision-making process of the implementation of Neo-Confucian entrepreneurs requires to be extracted from the permanent memory of the original values and knowledge related to the spirit of Confucianism and Confucian. For example, if a person decides whether to obey the principle of good faith in the transaction, he will remember the result induced by bad faith, and extract the entire decision-making process available in the various steps involved in heuristic knowledge. Decisions include the following aspects: (1) activating the knowledge relevant to the subject of Neo-Confucian entrepreneurs through the extraction, which is the considering choice and the individual value; (2) activating the knowledge in the decision-making process through the extraction; (3) analyzing the information in working memory by processing information.

Solving problem with the Confucian value.

If a person wants to achieve a purpose with obstacles, it would have to use the problem-solving process. The same as the decision-making, problem-solving requires to activate the knowledge of the subject. In business, there are a variety of problems frequently encountered, and it is very important to have the appropriate values before solving the problems. Many operators who are familiar with the "Three Character Classic", "Rules," "The Analects of Confucius" and Confucian works since young will subtly be dominated by Confucian values. Solving the problem with the Confucian value system includes the following components: (1) activating the value and the knowledge relevant to the subject of Confucian through the extraction; (2) activating the Confucian spirit, ideas and knowledge in the decision-making process through the extraction; (3) analyzing the information in working memory by processing information.

The experiment and investigation of Neo-Confucian entrepreneurs’ spirit.

In the modern market economy, it is a matter of concern whether Confucian entrepreneurs’ spirits and their culture are effective. Hu Xiao-lin, the chairman of the company of Beijing Huitonghuili Company, began to learn "Rules" and promote it in the company. Just in two years, not only he did turn a new leaf, but also countless employees rediscovered the family harmoniously and happily. Neo-Confucian entrepreneurs’ spirits implemented in the enterprises require experiments and follow-up survey. Its experimental exploration procedures include:(1) activating the value and the knowledge relevant to the subject of New Confucian merchant spirit through the extraction; (2) activating the knowledge involving New Confucian merchant spirit experiment process; (3) analyzing the information in working memory by processing information. The survey of new Confucian merchant spirit can also take the new experimental inquiry process similar to the method of the Neo-Confucian entrepreneurs experiment.
Clear goals and a new era of Neo-Confucian entrepreneurs’ thought.

Since the establishment of business schools in January 2003, the management and staff of business schools have set the educational philosophy thorough studies and discussions, of having "good faith, being learned, dedicated, and innovative", at the same time proposed developing new Confucian philosophy to adapt to globalization and socialist market in new era of economics "as the strategic objective. "Integrity" is "honesty and trustworthiness" for short. Honesty is the fundamental way of doing things, and one should be upright and act openly. The manifestation of personality is trustworthy. "Trust" is a promise, and responsibility. "Honesty" is the basis of trust; "trust" is the result of "honesty". The business school attaches great importance to "good integrity.” Education in personnel training, and teachers are required to do first of all with good faith, and then guide students to be "honest and trustworthy.” Running business requires profound knowledge and wisdom. The personnel training should practice "absorbing, integration innovation, self-development." "Dedication" is the execution of the undertaking by the pursuit of love, and strives for it. In the modern corporate culture, the concept of professionalism is very important, and also is an important expression form to the spirit of enterprise culture. Dedication can reflect the spirit, attitude and work style of the organizations and individuals, which is the "magic" for the organizations and individuals to participate in market competition. "Innovation" is the negation of the status quo. Innovation is also the power source for life self growth, self development and social enterprise continuous improvement. In personnel training, the students should be guided to stimulate awareness of innovation, the formation of innovative thinking, and they should find, think, analyse and solve problems with innovative thinking. That Is the so-called "teach him to fish, rather than teach him a fish."

Enhancing the combination of Neo-Confucian entrepreneurs’ thinking and social practice.

Our business school attached great importance to Neo-Confucian entrepreneurs and their personnel training in the following areas, and has achieved more significant results: First, we fully understand that the culture of Neo-Confucian entrepreneurs is the required objective of developing market economy. First of all, with fast economic globalization, talent competition turns to be the highest point of the world, and people's quality and culture are a decisive factor in competitiveness. Confucian culture is to adapt to the new globalization and the objective needs of the modern market economy. Next, Neo-Confucian entrepreneurs’ education runs as the key feature of our school; therefore, we must show responsibility for training. At last, developing Neo-Confucian entrepreneurs should be the social engineering of complex systems which need to set an example.

Secondly, teachers and students should be armed with a new spirit of Neo-Confucian entrepreneurs. It is asked that teachers and students pursue and perfect personality with rightness; and they should establish a correct outlook in life, possess values, moral and rational attitude to wealth, and knowledge. Besides, they should adhere to the life-long learning and continuous self-cultivation of morality with a dignified life and working sense.

Thirdly, "the four- stages education theory of Neo-Confucian entrepreneurs" is proposed, namely, freshman is for "caring education", sophomore for "integrity" of education, junior for advocacy for "entrepreneurship education", and senior for "Thanksgiving education." Despite the different emphases at different stages, the unity is of the 'new Confucian education. Since 2003, our annual "Neo-Confucian Entrepreneurs Cup" knowledge contest, had a greater impact in promoting implementation of and deepening of Neo-Confucian entrepreneurs’ education among teachers and students.
Fourthly, the overall strengthening management of student is practiced with the initial implementation of the "ABC Management Act," with the education philosophy of people-oriented management and having "good faith, being learned, dedicated, and innovative". Students work in all aspects of the "New Scholar project", which has effectively improved the overall quality of students. Through the Neo-Confucian entrepreneurs essay, the new knowledge of Neo-Confucian entrepreneurs Cup competition, the internal publication of "the sea", "Neo-Confucian entrepreneurs Express" and other forms of wide-ranging implications, a "Neo-Confucian entrepreneurs’ spirit" will be established for newcomers.

References


Intellectual Capital and Strategic Knowledge

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Abstract

The paper starts from knowledge revolution, indicating knowledge role—as raw material, production factor, product and capital—which transforms them in “the engine” of knowledge based economy. Major attention is given to presenting the main aspects of capital and intellectual property which contributes to perceiving their specificity and the economic, social and ecologic performances that it generates. The approach has an intensive multidisciplinary dimension. Finally, we present strategic knowledge which contributes decisively to the value of intellectual capital, indicating their main features - unique or rare, pragmatic, generating added value, dynamic and based on intense learning processes. Each feature is explained in the context of its contribution to the intellectual capital. Although, strategic knowledge is representing a small quantity and percentage in intellectual capital, from the economic point of view it has a major contribution. As a consequence, at the level of every organisation or of national economy it is recommended that a major attention to the strategic knowledge be given.

Keywords: Knowledge revolution, knowledge, knowledge role, intellectual capital, strategic knowledge, knowledge-based management
Background

The present economical, social, ecological and political evolutions are heavily influenced by the knowledge revolution which started a few decades ago.

Essentially, by knowledge revolution we designate fundamental change from predominantly physical resources-based economy to knowledge-based economy (Jones, 1999). At the base of this revolution is the decisive role of knowledge in modern economy. In the last decades it was noted and taken into consideration the growth of the economic importance of technologies, information, economic processes, human capital, organization’s capabilities and competencies—factors organically connected with knowledge. Each one of them, approached individually, reveals extremely valuable elements, with high pragmatic implications. Their common background is represented by knowledge, they, constituting as a matter of fact, individualization and operationalizational modalities of knowledge.

Since the early days, wealth and power were associated with possession of physical resources. Traditional production factors—land, equipment, buildings etc.—were of physical nature predominantly. That’s why the necessity to have vast and thorough knowledge was limited. Industrial revolution of past centuries was based predominantly on steam power, man’s physical strength and cash assets.

For the future a sensible different situation can be seen. Wealth and power in the 21st century will result mainly from intangible intellectual resources, from knowledge capital (Nicolescu & Nicolescu, 2005). Knowledge revolution, which consists of knowledge dominated economy, is a very far-reaching and profound process, generating essential changes in all economic activities components, analogue as intense as the ones produced by industrial revolution.

Knowledge in the new type of economy fulfills four essential roles or functions:
- Raw material
- Production factor
- Product
- Capital

Intellectual capital represents the main way within the knowledge and its multiple roles are valorized in economy and society. It has been analyzed by many specialists. Among these specialists are Serenko, Bontis, Booker, Sadeddin, and Hardie (2010); Dalkin (2008); Mangham (2004); Srinivisan (2004); Wick (2001); and Bukowitz and Williams (2000). Their approaches are rather different, but the main idea refers to the increasing and multiplying roles of intellectual capital.

Based on these studies and – especially – on our own analysis, we present in the next pages our point of view regarding the future of capital and intellectual property.

Discussion

Features of Capital and Intellectual Property

As it is known by all who are interested in the field of economic sciences, the base of each type of economy - slavery, feudal, socialist (communist) or capitalist - was constituted by a new type of property characterized by content and relations between people, highly specific, referring to object of property and to conditions of their participation to economic activities and results (and not only that), essentially different from the previous type of economy. The nature of property always determined specific configurations for the general economic system, ways and proportions sensibly different from peoples’ participation to sharing the results of the economic activities, with multiple essential consequences in all fields of human activity: economic, social, politic, cultural, and others.

This is why it is essential to examine if knowledge revolution and its new functions determine changes in the nature of property and capital and if these represent radically different elements compared
to the ones who define the nature of property of the actual economic system, of capitalist or post-
industrial type.

Analyses conducted by us have led, essentially, to two major conclusions: (1) Until the past
decades knowledge did not constitute the object of property but only sporadically. Starting only with the
last two-three decades we note their proliferation and apparition of some new forms of property on
knowledge, named intellectual property, with specific content and a substantial impact on economic
activities. (2) Intellectual property has a sensibly different content compared to classic property on land,
buildings, equipment, products etc. which determines other structures, mechanisms, utilization,
ownership, capitalization and appropriation of economic values.

The main specific aspects of intellectual property and capital are briefly presented in the
following:

1. Property and intellectual capital, because it has knowledge as main content, is predominantly
dematerialized, and most often not tangible. And so, practicing possession, decision, usage and
usufruct rights—of the owners—change radically compared to the property over tangible material
goods. Also, this type of property generates group and individual interests and motivations,
sensibly different compared to previous periods, which will reflect directly in new laws and
economic and social mechanisms, and indirectly also on the political, cultural, technological etc.
 elements.

2. Intellectual property presents a high degree of personalization because it incorporates not only
explicit knowledge but also relevant implicit knowledge. Additionally, frequently, in certified and
protected intellectual property it is impossible to integrate wholly knowledge generated by person
or persons involved in the processes of creating respective property. This situation determines
three main consequences: relativity of value and price on intellectual property respectively
because the same new knowledge generated or owned and/or sold by highly competent and
entrepreneurial persons generating a much higher market value compared to the same new
knowledge generated, owned and/or sold by persons with inferior competence and entrepreneurial
abilities; further owning of the competitive advantage by the specialists who generated the
intellectual property which motivates the entrepreneurs and managers to involve them in future
capitalization processes of the respective intellectual property; some relativity of the
determination to the value of intellectual property, which is as high as its contents and implicit
knowledge have a higher weight.

3. Intellectual property presents, often, high fluidity and volatility, because of the nature of
incorporated knowledge and because of the appreciable dependency of its value and usefulness
by contextual evolutions in the involved field, frequently very dynamic and new. And so, storing
intellectual property is difficult and often risky because in short periods an appreciable market
value of the respective property can be lost, wasting long and intense creative efforts.

4. The same intellectual capital can be used simultaneously and independently inside two or more
organisations, generating added value simultaneously, which no element of tangible property can
realize. And so the owner of the respective intellectual property can sell it to many companies,
naturally based on contracts which regulate in this way its sale. By simultaneously selling and
using the same intellectual property to many clients it is possible that the commercial value, the
capacity to produce profit of the involved knowledge will diminish at the level of one
organization or even on a larger scale. Intellectual property can double, triple etc. (multiply) from
the point of view of its usage and capitalization in economical processes and this determines a
substantial growth of work productivity and diminishes investments and unit price.
5. Intellectual property, in contrast to classical property, does not outdate physically by using it inside economic processes. On the contrary, because by using respective knowledge, it grows and amplifies through innovation, generating and integrating inside it new knowledge which increases its market value and usage value. This way the physical outdate pressure disappears, to which all material property and capital are exposed, predominant in the capitalist type economy.

6. Rapidity of innovation processes, of knowledge renewal reflected in their short life cycle and in its tendency to diminish, causes a high moral outdate of intellectual property. As a consequence, it is necessary to capitalize as fast as possible intellectual property in order to avoid its depreciation before achieving „de facto“ the usufruct right of the owner. More than this, facing moral outdate of knowledge, which represents the contents of some intellectual property, induces a stimulating impact on further production and capitalization of new knowledge and/or of new intellectual property.

7. Intellectual property, used in business processes, can generate both classic products and products knowledge, whose value is represented almost totally only by incorporated knowledge and not by expenses of material production factors (tangible raw materials, means of production, etc.). Tendency is toward rapid amplification of generation by intellectual capital of products knowledge or of products which, even though they take a material shape, contain largely knowledge representing the main part of their value structure and price.

8. The specific of intellectual property make it not rarely difficult to separate legally, economically and operationally the right to possess by the owners, of decision, usage and usufruct rights. Especially important is the relation between possession rights and, respectively, usage of knowledge which represents the contents of intellectual capital. Complicated situations arise, difficult to solve, because the owners right to possess that knowledge does not guarantee exercising de facto the other three rights including usage right. More than this, by using intellectual capital, frequently it is produced, because of innovation, by generating new knowledge, a growth of its performance and value.

9. Amplifying participative character of generating knowledge, especially in high level fields characterized by high complexity and dynamism, generate major difficulties in establishing their paternity and on these grounds of de jure owners and in using and capitalizing respective knowledge inside the organization where they were produced and outside them. The solution used more and more frequently in this situation resides in patenting new technologies, products, software, etc. on the name of the whole group directly involved in producing them. In the same manner, amplifying the participative character of knowledge usage processes, which generation of new knowledge takes place and development of the existing ones, makes it difficult to establish possession rights over them, and following as well, decision, usage and usufruct rights.

10. Practice demonstrates that there is the possibility to generate simultaneously identical knowledge by different persons or groups who work independently, without collaborating or even without knowing that the others exist. In actual conditions, when an unprecedented intensification of innovative activity takes place and—in various areas of the world—specialists and groups of specialists handle the same problems and seek solutions to the same market demands for products and services, frequency of such cases multiplies with a growing tendency. In these circumstances, the difficult problem of establishing ownership rights on respective knowledge and over their capitalization arises.
11. Specificity of knowledge that forms the object of intellectual property makes it extremely difficult to protect them. A new type of theft appears, widely applied today, but almost inexistent in previous types of economies and that is the theft of usage value of intellectual property. In other words, even though the owner owns property over knowledge registered with competent authorities and does not alienate it, by information leaks or by “taking over” knowledge based on product analysis, other persons use these intellectual properties, without paying the price for them. The actual situation is well known when China produces annually goods for tens of billions of dollars using the knowledge generated with much effort and expenses by their competitors from USA, EU or Japan, by copying respective products, without paying the royalties to respective owners, without buying licenses, patents, etc. More than this, also the possibility to steal intellectual property appears without the owner’s knowing it and thus without any reaction from the owner because apparently, but also de facto, he is exercising his ownership rights without having as a subject the stolen knowledge from his intellectual property. These elements give protection to intellectual property a major social and economical importance and contents, sensibly different from the ones of classical property protection.

12. Value of new knowledge which forms the object of intellectual property is rising by informing the market and potential clients of its existence and utility, motivating efforts and costs for their spreading. At the same time the difficulty to protect them amplifies, and great in the risk in “theft” by other persons or organizations and of their capitalization, showing no respect for possession, decision, usage, usufruct rights of the legitimate owner on respective knowledge.

13. Coexistence and co-operation between owners of intellectual properties and owners of classic properties, with tangible content, when they are different, raise new problems, totally different from previous practices and which impose radical change of legislation concerning property and economic activities and implicitly of business organizations and institutions with economic attributions. It will be necessary to project legislation for regulating protection and usage of intellectual property, much more comprehensive and operational than laws concerning intellectual property protection adopted in most of world states in the last decades. At the same time, there will have to be designed new specific institutions which will not be Office for Inventions and Trademarks in each country, that shall ensure correct and operational application of legislation on intellectual property, but also stimulates generation and efficient usage of knowledge. Simultaneously, it will be necessary to modify the whole functional mechanism of national and world level in order to create the framework and favourable structures for production and performance management of property and intellectual property, in all areas and types of organizations.

14. Development and preponderance of intellectual property at macro-economic level will reflect also changes in sources of development and economic structure of every country and of every international economic area. Economic and social phenomena like Microsoft or Nokia will be much more frequent, of course, especially in national and international economic environments favourable to producing, using, selling, storing, protecting and capitalizing knowledge. At the same time, inside more and more classic companies, knowledge will play an essential role. In these circumstances the economical structures will acquire new configurations, more surprising than the ones that appeared recently in the most developed countries of the world, national and international economic performances being obtained by using less and less tangible material resources but with predominant consumption of knowledge and focus on products knowledge. Dynamicity and fluidity of business activities and structures will amplify step by step, their development being based on new laws and mechanisms.
15. Concomitantly the social structure of the population will modify itself. Social categories the activity of which has a predominant intellectual content will make up for the majority in numbers and quality inside the society. Managers, specialists, consultants, trainers, regardless of profession and jobs, focused on generating, using and capitalizing knowledge will be more and more numerous and will exert a determinant influence in economic and society management. Degree of economic and social homogeneity of the population will amplify, given the circumstances that the elite will have their capacity recognized and their manifestation in the interest of economic and social development will be facilitated. Elites among professionals, focused on knowledge, will take the lead step by step in all fields and industries. The main motivations for their efforts and performances are related in the first place with the nature of the exercised work processes, by the satisfaction of obtaining successes, by manifestation inside a stimulating environment for the production and efficient usage of knowledge. Financial-material motivations, absolutely necessary of course, will not be the most important.

All these changes will require a few decades, but the rate their development will be very quick, surprising many persons and political power, economic or social centres. Like all essentially new processes, their implementation will take place with tensions, tripping, even resistance, more often in those areas of the world where political and economical elites do not understand the sense of these objective evolutions and do not strive for the wise way of integrating actions in changes that come with constructing knowledge-based economy and society.

Determinant factor for imposing new economy based on knowledge will be represented by - as always during human kind development when the economy changed to a new type - increased productivity and business performances determined by intellectual property.

**Strategic Knowledge, Major Component of the Intellectual Capital**

In the entirety of intellectual capital and property, not all knowledge has the same role and impact. Analysis of most performance knowledge-based companies shows shaping up of a new type of knowledge - strategic knowledge. This is essential for sustainable development of the company and consists of - as specialist, Grunwald (2004) showing combinations of orientation knowledge, explicit knowledge and action guiding knowledge. Generating this new type of knowledge represents a new type of challenge for managerial theory and practice for businessmen.

According to our analyses, strategic knowledge presents a set of specific aspects (Nicolescu, 2009/2004), displayed in Figure 1, on which we consider necessary to underline the following:
**Figure 1. Main aspects of strategic knowledge**

- **unique or rare**, signifying either they are not to be found in other companies, or they are possessed in a similar shape but in a limited number of other organizations. The more rare strategic knowledge is, the more they have a wider strategic advantage for the organization.
- **pragmatic or exploitable**, signifying that they can generate new products or services inside the company or they can improve the existing ones through innovation them. This aspect reaches climax when knowledge itself becomes product, being sold on the market as such.
- **generating added value**, meaning that by using them added value for the company is created, value which is recognized on the market. Strategic knowledge is always a part of the company’s value vector.
- **difficult to imitate and/or substitute with other knowledge**, aspect which insures company’s sustainability and profitability on medium and long term. The more the tacit and innovative knowledge has more weight inside the company, the more intense this characteristic of knowledge is.
- **dynamic**, signifying that knowledge can be updated and modified according to changes in the company’s endogenous and exogenous environment, especially to market demand. Dynamicy refers both to knowledge contents and to their shape and ways of manifestation.
- **based on intense learning processes**, whose continuous operationalization is decisively for maintaining the other aspects of strategic knowledge. Intense learning processes, even though difficult and resource consuming, constitute the best protection for maintaining and amplifying the strategic knowledge character.
Without any doubt, intellectual capital contains all kinds of knowledge. Although strategic knowledge has low quantity and percentage in the intellectual capital, from the economic point of view it has a major contribution.

As a consequence, at the level of every organization or of the national economy it is recommended to pay a major attention to the strategic knowledge. In such an approach, at the same volume of time, money and other resources used, an intellectual capital with higher productivity and market value shall be generated. The background of such an approach could be representative only by special knowledge based strategy and managerial mechanism (Nicolescu & Nicolescu, 2005).

References

Managing Research at Lucian Blaga University of Sibiu

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Abstract

Nowadays, universities have to continuously improve their strategies in order to be able to provide well-shaped human resources on the market. Also, the fact that many universities manage to defend against the ongoing economic crisis by financially supporting themselves through the theoretical and practical knowledge export on the market. This is mainly possible through research grants both from national and international competitions but also through collaborations on research projects between academia and business companies from different fields. Nevertheless, in order to gain an expertise, one has to invest time, dedication and hard work. In this regard, the Research Department of “Lucian Blaga” University of Sibiu (LBUS) is acting like a manager who plans a sustainable strategy to provide the university a certain degree of financial independence by applying Quality Management in the academic research field.

Keywords: Entrepreneurship, knowledge management, quality assurance, knowledge-based economy, quality management system (QMS).
Background

Raison d'être

It was proven that entrepreneurship drives countries’ economies according to World Economic Forum (2010) and therefore, its features should be thoroughly assessed and implemented in all the fields that need a constant financial income. This represents the core of all the fields encompassed in an effective economy.

Nevertheless, this paper will focus on the entrepreneurial aspects that regards academic research and generally the educational system. Much can be said around this subject but things are likely to set hurdles once the theoretical ideas are actually implemented. For this purpose, the examples referred in this paper are genuine – there are real procedures implemented and ran by the Research Department of LBUS which is why the conclusions that are going to round-up the paper can provide a real perspective upon the methods by which any university can increase its international visibility and consequently, its income.

In this regard, the mission of the Research Department of LBUS is to plan, project and implement strategies that focus on assuring a high level scientific research. Therefore the main action threads of this Department regard creating an effective and real management of the scientific research activity, directing the research developed within LBUS towards society’s long and medium term needs, integrating itself in international research networks, creating a trustworthy environment for the academic circles of this university to promote a successful scientific collaboration based on a decisional transparency and modernizing the resources which the university are basing on for its scientific undertakings.

Some of the main fundamental that leads in assuring the quality of the academic research activity should be, promoting education and research in line with the exigencies issued by a knowledge-based society and life-long learning integrated in the European and world-wide circuit. Furthermore, contributing with innovations in the foreground programs of the beginning of the 21st century is also one of the main requirements of a proper entrepreneurial approach in the academic research field. In line with these aspects, a wide-range, flexible, interactive and continuous education of both students and higher-education graduates should be promoted in order to maintain a constant interaction with the economic, social and academic environment at a local, national and international level.

Discussion

A Paradigm Shift: Knowledge-based Economy

In the current economic context, academic research has to adopt a client-oriented approach because if it doesn’t produce an extra income, it cannot assure quality to their daily activities that will enable the achievement of the above mentioned objectives.

The Human Resources Training Center (HRTC)’s purpose stated with the occasion of the 3rd edition of “The Forum for debating Strategic Partnership between Academic Research and Romanian Business Community”. This will give an in-sight look to the state of the art innovation, best practices in common Europe, but not limited to the goal (2025) of Knowledge Society consolidation in EU (Moisescu, 2010).

Hence, the following, as acknowledged above (Moisescu, 2010), represents fast reactive missions that involve new synergetic multi-roles essential to be considered by academia:

• Knowledge broker within knowledge society
• Promoter of advanced complex projects involved in both National competitions and European contest (FP7, NATO, Socrates Erasmus, Tempus, etc.)
• Catalyst to synchronize the Romanian academic research with EU advanced research as: Digital Business Ecosystems, Living Laboratories (e-healthcare, e-Government, etc), FiInES Future Internet Enterprise Systems involving the following triad: Internet of Things (IoT), Internet of Services (IoS), Internet of Knowledge (IoK) and Internet of People (IoP)
• Business incubator – RENIT network
• LLL (life-long learning) paradigm oriented coach and trainer

As Dumitrache (2010) infers, university is connected directly to innovation and development by definition. Thus, knowledge is an important asset of any university. Furthermore, the human resources trained in universities provide the market a fundamental element of a working economy, and therefore, universities have to be seen in a direct relationship with the society because they transferred the best produced on the market for the economy and implicitly for the society as presented in Figure 1.

In return, the society is required to support the universities by enabling them to have a chance on implementing their end-products in real-world problems. This would be possible through the establishment of a special collaboration route as university – via R&D departments – market (i.e. economy).

Figure 1. The influence of innovation from university to social environment (Dumitrache, 2010)
According to Ionescu and Dumitraş (2008) various observers describe today’s global economy as one in transition to a knowledge economy, as an extension of an information society. The transition requires that the rules and practices which determine success in the industrial economy need rewriting in an interconnected, globalized economy, where in knowledge resources such as know-how and expertise are as critical as other economic resources. According to analysts of the knowledge economy, these rules need to be rewritten at the levels of firms and industries in terms of knowledge management and at the level of public policy as knowledge policy or knowledge-related policy.

Another important component of the academic research that has to be analyzed in this context would be the quality management system in research which will be detailed further on in the next section.

Research Strategic Goals at LBUS

One of the important aims is to develop science and technology through which to maintain this university among the prestigious ones at both national and international level, to improve the social quality and to increase the knowledge in order to enable a proper exploitation to enlarge the action span. In order to make this possible, three strategic objectives are proposed:

1. Creating knowledge and implicitly attaining top line scientific and technological results which to be nationally and internationally competitive in order to increase the international visibility and the results’ transfer in economy and society. So as to attain this objective, one has to penetrate national and international networks and promote excellence in research. The excellence research centers, internationally recognized as such, will be supported. Also the necessary facilities for top research will be provided in order for young researchers to be suitably shaped through doctoral studies. None the less, a challenging environment should be provided for PhD graduates to keep them competitive. Excellency poles should be created by financing research projects advanced by researchers with comprehensive capabilities that would be internationally appreciated. Emphasize should be on shaping young researchers in excellent doctoral and post-doctoral schools for them to benefit from an appropriate guidance in increasing the ability of developing advanced researches.

2. Improving the high-impact innovative research is used in the economic environment and knowledge exchange in practices. This objective aims in obtaining great technological results, complex problem solving researches, developing innovative technologies, products and services with a direct applicability. In this regard, the partnerships with the research institutes and the economic agents should be stimulated.

3. Increasing social quality by developing solutions, including technological solution, in order to generate direct benefits in the society. Also, included in this category: local, regional and national matters regarding the social cohesion and dynamics, increasing the policy efficiency as well as problems regarding the environment, health, infrastructure, landscaping and national resources employ.

In order to achieve the above strategic objectives the following specific objectives should be considered:

1. **Increasing the number of staff involved in research activities**
   This objective can be achieved by elaborating individual and group research programs/plans in conformity with the scientific level of the teaching staff and allocating in this regard a research quota for each and one of them. Also, it should be encouraged the formation of inter-disciplinary working groups which will benefit from the experienced researchers’ know-how.

2. **Creating research centers and infrastructures**
   In this regard, a university has to have continuously updated documentation resources, especially electronic database and on-line libraries. The already established research centers should be
periodically evaluated and their permanence to be conditioned by the results they bring. For an enhanced flow of their activity there are yearly allocated complementary budgets earned by competition for equipping the excellence research with state of the art devices. A real support for the research centers would be endorsing a common research infrastructure with organizations belonging to the industrial environment.

3. **Promoting and supporting participation to competitions for financing**
   For this purpose, there should be allocated extra-budgetary financial resources for upholding research competitions. However, the first step is identifying the main research domains (areas) in accordance with the national and international priorities considering in this regard also the research domains in which the university proved good results.

4. **Efficiently managing the research**
   Constantly updating the regulations for research activities in conformity with local and national priorities is one of the most important requirements for an officially management of the research. In line with this aspect, there would be recommended that a university to enable job positions which will support the researcher such as: financial and technical consultant, legal advisor – necessary for elaborating and developing research projects as well as for managerial purposes. In this environment, a spin-off department would be highly appreciated for dealing with the aspects regarding the way the research results are fructified further on.

**Quality Management System (QMS) in Research**

When approaching the problem of quality management in research one has to consider the main interfaces between the quality system, the measurement and supervising criterions and process owners (Kifor, 2003).

The quality management system of LBUS research activity is developed based on ISO 9001 model and it includes the following (Figure 2):

- The mission and the perspective upon the scientific research as well as the policies and objectives on all the relevant levels;
- The functions and responsibilities required for designing, implementing and maintaining the research management system – in the consequent section regarding Management Responsibility;
- The necessary resources for attaining the objectives – within the Management of Resources;
- The research processes – within the Research Development;
- Monitoring and evaluation results – in the consequent section regarding Measurement, Analysis and Improvement.
It was stated even by the Lisbon strategy (Parliament, 2000) the fact that research needs quality management systems. Strategic quality management is essential for entrepreneurial universities in order to produce not only qualitative research but also to penetrate the economy by the means of the knowledge transfer.

Until now, quality management was often fragmented. For instance, there was a quality check at the start of a new research project in the grant selection process, and another at the end through peer review publication. But during the balance of the research process, quality management was frequently left to researchers and their institutions (TDR, 2000).
The activities that should be included are: developing the necessary quality management tools and procedures, providing training on good practices research, as well as creating connections with the business and industrial environment from national and international levels.

Also, according to Walker (1997) University shares many goals and objectives in common with leading universities all over the world, including a commitment to excellence in education, in the conduct of research, and the development of highly-skilled human resources for the benefit of the individual and the wider community. The key performance indicators of such academic excellence are seen to include:

- the research output of papers published at conferences, and accepted for publication in well-known journals (indexed in international data-base and ISI Web of Science data-base);
- the number of PhD students graduating in the allotted period of time;
- the role played by the academe in professional forums;
- the commitment to excellence in teaching activity, and also,
- the funds raised from research projects and external collaborations with the economic segment.

“Lucian Blaga” University of Sibiu committed to such a performance indicators and it is continuously seeking funding opportunities either through research grants (from national and international/European competitions), research contracts with companies from different fields (from the public and private sector) and by promoting excellence – in this regard, based on the quality indicator which is assessed in universities every year, a certain financial support can come from the National Government in the conformity with the performances reported by the universities in the previous year.

Therefore, this quality indicator sets some standards as university has to commit in order to receive the financial support and to be able to remain competitive among other universities when it comes to funding opportunities. Hence, the Research Department has a very important task of indentifying the research sectors in the university that can be further on improved and can also set higher targets in order to be up to the mark.

Furthermore, an important gear in this system is represented by the research centers comprised in university because they embody the very core of the research by concentrating on the best researchers that a university has in a certain domain. The research centers that are to be identified by the National Council of Research in Higher Education as centers of Excellence (the best research centers at the national level and actively involved partners at the international level) would be able to compete to become Schools of Excellence. These Schools will be financially supported through a strategic project in order to promote eligible Romanian university among the first 500 in the world.

Conclusion

This paper is a strong appeal for a quality management system in all fields of research and development. It will probably provide a coherent model for managing research in universities by constantly adopting quality assurance methods in order to provide funding solutions for universities through the use of internal resources that a university possesses such as: human capital, existing infrastructure, research ideas and products.

The perspective provided in this paper follows the means by which the universities could round-up their incomes and also actively engage in an academic-economic relationship which will bring benefits for both sides.

The approach-based on a QMS leads to more efficient process and activities. It sensitizes the personnel and provides a structure for a sustainable improvement. ISO 9001 provides such a model which can be easily adapted also for managing research. However, the individual model has to be developed in a flexible way in order to cover all the requirements and in the same time to avoid triggering an excessive bureaucratization of the activities.
References


Entrepreneurship in an Outcomes-Based Education for Engineering Students

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Abstract

Majority of engineering schools in the Philippines do not offer entrepreneurship as course in engineering programs. Labor and Graduate Tracer studies show that growth of a million jobs did not translate into lower unemployment rate because there is a mismatch of industry requirements and the educational preparation. The lead time in finding the qualified applicant show that there is indeed a gap on the quality of graduates despite of increased on-the-job training from 120 hours to 6 months and other reforms. This study examines selected current engineering curricula in the Philippines with respect to its counterparts in the regional and global perspective to at least develop potential alternative measure and address the plight of the Unemployed Undergraduate and/or Graduate through Outcomes-Based Education. The flexibility and adaptability of the engineering students and graduates are also tackled given the kind of regional economic outlook.

Keywords: engineering curriculum, entrepreneurship, outcomes-based education
Background

The Department of Education, Culture, and Sports (DECS), the Commission on Higher Education (CHED) and the Technical Education and Skills Development Authority (TESDA) constitute the trifocal structure of the Philippine educational system (www.education.stateuniversity.com & www.immigration.alberta.ca/iqas). DECS focuses on the basic education in the primary and secondary levels, CHED is on the interdisciplinary tertiary level courses, while TESDA is into the realization of the vocational and technical skills.

In colleges and universities, CHED gives mandate and issues Memorandum Orders that must be satisfied in the curriculum design of professional programs. The CHED Memorandum Orders (CMOs) specify the engineering competencies needed to be achieved by the students. These CMOs plus the competencies targeted by the vision and mission of an academic institution form the institutional goals.

Institutional goals are then broken down per program level or per departmental level. They are then subdivided for the various courses in one program, converted to what is known as course objectives. In a course, there has to be several units, and the units are composed of numerous lessons. Wiggins and McTighe (1999) called the method similar to the curriculum mapping described above as backward design (Understanding by Design and Curriculum Mapping, 2009).

Among the various local universities offering engineering courses, University of the Philippines College of Engineering, for one, has Technology Entrepreneurship as elective subject (http://www.yugatech.com/blog/netrepreneur/technology-entrepreneurship-class-in-up/, 2008).

De La Salle University has Bachelor of Science in Industrial Management Engineering minor in Service Management. This program prepares the students to pursue a career as Industrial Engineers (IEs) or to become entrepreneurs in Restaurant Services, Selling and Retail Operations, Call Center Operations, Health Care Management, Public Administration and Services, and/or Airport Operations Management (www.dlsu.edu.ph, 2010).

However, majority of engineering schools in the Philippines do not offer entrepreneurship as subject in engineering programs. What they have as general courses are Engineering Economy and Engineering Management. In IE program, there are Accounting, Finance, and Marketing courses which are business-related but are not specifically entrepreneurship focused.

Arnold (2002) said: “On the surface, engineers and entrepreneurs might appear to have little in common”. He further argued that: “Entrepreneurs seem to thrive in chaotic and uncertain climates far removed from the orderly and methodical world of engineers, where calculations and data are applied to design solutions that eliminate uncertainty and risk. Even our universities separate the engineering colleges from the business colleges” (The Institute of Electrical and Electronics, Inc, 2003).

Based on the study of Department of Labor & Employment (DOLE) together with the Commission on Higher Education (CHED) on the Overview of the Graduate Tracer Study and Labor Market, the growth of a million jobs did not translate into lower unemployment rate (Soriano & Ward, 2007). In the said study of the Labor Force Survey in 2000-2004, ages 15-24 years old, the Unemployed Youth-College Undergraduate was 32.4% while the Unemployed Youth-College Graduate was 15.4%. The study also cited some national indicators like the following: Graduation rate is at 46%; Even if the OJT requires at least 120 hours to at most 6 months, employment rate for college graduates in 2001 and 2002 is estimated at 58%; and Mean Waiting Time to land a job varies by school with the earliest at 1.82 months to about 5.3 months.

Soriano and Ward (2007) also mentioned about the study of the Asia Pacific Economic Cooperation (APEC) citing the mismatch between industry requirements and educational preparation. Educational flaws stems from poor curriculum, inadequate teacher training, and low investment in education. APEC Study also noted that it takes 4-7 weeks to fill-up technical position, and it takes 12-15 weeks before finding the qualified applicant.
In 2009, the Technological Institute of the Philippines (TIP) conducted a research on industry-desired competencies and graduate profile (covering engineering, business, and information education disciplines). The top five industry-desired competencies on Personal Skills are: Initiative; Flexibility; Punctuality; Emotional Maturity; and Approachability (TIP Research Group, 2010). In terms of Human Relations and Interpersonal Relationship, the following skills were identified: Teamwork and Collaboration; Adaptability; Helpfulness; and Friendliness.

The mismatch of industry requirements and the educational preparation that APEC pointed out, and the lead time in finding the qualified applicant show that there is indeed a gap on the quality of graduates despite the CHED’s policy of increased on-the-job training from 120 hours to 6 months and other reforms. This study shall examine the engineering curriculum in the Philippines with respect to its counterparts, and develop potential corrective measures to address the plight of the Unemployed Undergraduate and the Unemployed Graduate, and even the flexibility and adaptability of the engineering students and graduates.

Objectives of the Study

Develop a potential alternative solution on the educational system that may increase the quality of local engineering students and graduates. Specifically, this study aims to:

1. cite the engineering and entrepreneurship curriculum among some selected regional and global perspective;
2. identify local focus and practices of engineering education on study; and
3. develop a potential alternative on how to catch up with the global and regional engineering curriculum trends.

Theoretical Framework

Literature – Regional (Asia and the Pacific)

The Indo-Asian News Service (2009) reported that engineering graduates lack employable skills (cited from www.southasianews.com/449167/Engineering-graduates-lack-employable-skills:-Survey-.htm). According to the survey jointly carried out by the Federation of Indian Chambers of Commerce and Industry (FICCI) and the World Bank, 64% of surveyed employers are 'somewhat', 'not very', or 'not at all' satisfied with the quality of engineering graduates' skills.

The survey identified the top three most important general skills as integrity, reliability and teamwork, while the top three most important specific skills are entrepreneurship, communication in English and use of modern tools and technologies.

'If colleges want to improve the employability of their graduates, they have to focus on reducing these important skill gaps through improvements in curriculum and teaching methods.' said Hiroshi Saeki, an analyst at the World Bank (Indo-Asian News-New Delhi, 2009).

*Entrepreneurship curriculum for engineers* is very important (Bae, 2004).

In recent decades, East Asia has become what Toyoo Gyohten, a doyen of the Japanese financial world, describes as the “factory” of the world, but its production lines are grinding to a halt now in the midst of the global economic crisis (Rowley, 2009).

Economic condition determines the contribution to employment of graduates or undergraduates. “Asia was very successful in establishing a regional manufacturing center - a global factory. The Asian factory enjoyed a very high level of activity and everyone profited but because they had to rely substantially on (external) demand, when this collapsed, the factory collapsed”, Gyohten said in an interview for ADB (Rowley, 2009).
Countries in the region should not rely only on a “vertical” system of production whereby they produce different parts of a product that is finally shipped to markets outside the region. Instead they should shift to a “horizontal” model where goods are designed and produced more in a particular country for consumption in that country (Rowley, 2009).

Such horizontal model may be likened to the wild-geese flying formation paradigm of Japan. It is portrayed as a sequence of the inverse V-shaped industrial development of the Pacific Asian countries and it also connotes restructuring and industrial adjustment cooperation in the region (Yamazawa, 1990).

Revival of the Flying Geese Model, in the Speech of Yap (2010), was mentioned as the 2nd strategy in increasing intra-regional trade and investment to reduce dependence on Western markets. The idea is to produce more “wage goods” and less “luxury goods”. In Asia, Singapore and Malaysia are over-reliant on Exports, China is over-reliant on Investment, while Philippines is over-reliant on Consumption (Yap, 2010).

The United Nations Industrial Development Organization (UNIDO), emphasizes the strengthening of the private sector, which is the main driving force of industrial development in almost all countries. In particular, this service module seeks to promote the development of small and medium-sized enterprises (SMEs), which play a leading role in generating employment, income and value added, and in providing the seedbed for developing and testing entrepreneurial talent, but which are constrained by a variety of market failures reducing their access to resources and their bargaining power. (UNIDO Annual Report, 2003). If another UNIDO report is reviewed, one will observe that the SMEs’ support and mandate occurs in Asia and the Pacific (UNIDO, 2002).

Literature—Europe and Latin America

In Europe and in Latin America and the Caribbean, the thrusts are on cleaner and sustainable industrial production, and strengthening industrial capacities (UNIDO, 2002). Thus, this gives an idea on what type of enterprises thrive in these areas that may be owned by anyone or that may employ graduates and undergraduates.

Literature—Engineering Curriculum and Entrepreneurship

As George Berbeco (an entrepreneur) explained when asked why engineers should learn entrepreneurial skills, "If an engineer is not an entrepreneur, he is just a tool" (Fredholm, Krejcarek, Krumholz, Linquist, Munson, Schiffman, & Bourne, 2002 as cited in Dabbagh, Nada, Menasc, & Daniel, 2006).

It is no longer adequate for engineering students to graduate with strong technical skills (McAnear, & Seat, 2001 as cited in Dabbagh, et al., 2006). Most engineering program curricula have been dominated by design-and-build projects with an emphasis on technical excellence that has, for the most part, excluded developing an understanding of market forces and context (Ohland, Frillman, Zhang, & Miller III, 2004 as cited in Dabbagh, et al., 2006).

In its April 2009 report, the Global Economic Initiative of the World Economic Forum (WEF) called the world community to action in four ways: (1) Transform the educational system to encourage creativity, innovation, and thinking outside-the-box problem solving; (2) Build the entrepreneurial ecosystem; (3) Strive for effective impact and outcomes; and (4) Leverage technology as an enabler (Sidhu, Tenderich, & Broderick, 2010).

A meeting of engineering entrepreneurship educators from 18 universities, addressed how entrepreneurship education can engage meaningful global problems with talks from the University of California, Berkeley, and University College London during the session on “Translational Research in Entrepreneurship Curricula” (Sidhu, et al., 2010).

Just as Dugald C. Jackson encountered when he championed the formation of the cooperative education engineering curriculum at Massachusetts Institute of Technology in the early 1900s, advocates
for teaching entrepreneurship to engineering students again face a “clash of values and expectations” (Carlson, 1988 as cited in Standish-Kuon, & Rice, 2002).

Given the newness of the field of technological entrepreneurship and its location at the boundary of academia and practice, legitimacy is clearly an issue. There were three legitimacy-enhancing strategies cited (Standish-Kuon, & Rice, 2002) and two of them were: to embark on engineering with entrepreneurship program that links with practicing entrepreneurs who will lend credibility to course content, and frequently generate financial support for the program and the university; and ensure that courses are well-constructed.

Zitterkopf (1994) pointed out that a school that does not specify outcomes. It simply accepts whatever comes as a result of the educational process and, places little, if any, emphasis on attaining results. Subsequently, quality in the process and product is acquired somewhat arbitrarily (Killen, 2000).

Smilor (2001) as cited in KCELS (2001) gave an overall perspective of the entrepreneur participation. Students in and out of the classroom increased in the mid to late 1990s as experiential teaching methods such as field studies, business plan competitions, and intern programs, became more popular.

KCELS (2001) identified the most popular teaching methods in entrepreneurship education, based on the 1999-2000 Winslow-Solomon study, which focused on the creation of business plans, case studies and lectures, respectively. In 1997, guest speaker method was next to Business Plan and Case study.

Rapid spread of various forms of outcomes-based education in countries such as the United States and the United Kingdom occurred during the 1980s and 1990s. In Australia, the concept of educational accountability was one of the driving motives behind the introduction of Outcomes-Based Education (Killen, 2000).

Outcomes-Based Education (OBE) is adopted in significant ways in the United States, Australia, South Africa, Hong Kong, and other countries (retrieved July 2010 from www.answers.com/topic/outcome-based-education).

According to Biggs (2006), OBE and Outcomes-Based Teaching and Learning (OBTL) are both outcomes-focused but OBE is on a program-level while OBTL is on a course-level.

Figure 1 is the diagram to better understand the outcomes using Spady’s (1994) Development of Outcomes Model. Terminologies may vary a bit in other selections but they still represent the levels similar to those shown here.

**Figure 1. Spady Development of Outcomes Model**

EXIT Outcomes → PROGRAM Outcomes → COURSE Outcomes → UNIT Outcomes → LESSON Outcomes

Whereas, the Three-Legged Chair Model (Figure 2) was used for this study to generate and justify the proposed solution. The alternative solution took direction from the Queensland Schools Style where OBE is regarded as seated on a Three-Legged Chair with matting underneath.

OBE is represented by one leg, the other leg for lesson writing, and the other leg for curriculum mandate (www.teachers.ash.org.au/bce/obe.htm). Steve Smith believed that the chair stands on three legs, each with the support and development of each. They are not totally exclusive from each other, otherwise the chair will collapse. The legs are supported by a mat representing the reporting and assessment side of each of the leg functions.
Students taught under OBTL Methodology are being assessed through criterion-referenced tests (CRT) and not norm-referenced tests (NRT). NRT ranks each student with respect to the achievement of others in broad areas of knowledge while CRT compares each individual achievement with a preset standard for acceptable achievement and the performance of other students is irrelevant (Popham, 1975 retrieved from http://chiron.valdosta.edu/whuitt/col/measeval/crnmref.htm).

Figure 3 illustrates the conceptual framework with the Gap Analysis of the Regional and Global Outlook and the Current Local Context of Engineering Curriculum as the bases of drawing out potential alternative solution to catch up with the regional and global trends in engineering education.

**Figure 3. Conceptual Framework**
Methodology

A descriptive-type of research was used in the conduct of this study. Literature Review was done to gather the related topics on Engineering, Curriculum, and the surfacing trend of integration of the engineering with entrepreneurship. Economic Outlook was also gathered as long as it is in line with or affecting the practice of profession of the engineers. Methods of teaching and skills development of the students became another eventual need in the data gathering.

Results and Discussion

On the Engineering and Entrepreneurship Curriculum in the Regional and Global Perspective

The selected perspective in Asia Pacific Region includes Korea, Japan, and Singapore with some related studies in China. Global perspective here is depicted by the studies and conditions in Oceanic (Australia & New Zealand), Canada, United States of America, and Europe.

Table 1 summarizes the engineering and entrepreneurship curricula among the places mentioned.

<table>
<thead>
<tr>
<th>Region</th>
<th>Korea</th>
<th>Policy makers need to be very careful about duplicating programs from other parts of the world. Europe countries are particularly prone to this problem (Dasher, 2003).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia-Pacific &amp; Oceanic</td>
<td>“Engineers should learn entrepreneurship management, regardless of their career path, to better utilize their technological knowledge” (Zong-Tae Bae, 2004).</td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>The Journal of Asia Entrepreneurship and Sustainability (2006) had featured a study on the comparison of entrepreneurship action learning outcomes for undergraduate students in Germany, Singapore, China, Korea, New Zealand, United States, and Australia. (Mueller, Wyatt, Klandt, &amp; Liang, 2006).</td>
<td>* Shift from traditional paradigms to more unconventional, experiential based teaching of entrepreneurship at the university level. * Colleges and universities respond to research that encourages both real-world projects and extracurricular learning activities to better teach entrepreneurship, such as internships, business plan competitions and student clubs (Kauffman Center for Entrepreneurial Leadership Staff, 2001).</td>
</tr>
</tbody>
</table>

The preperation of students even at the high school level is being addressed by Dr. Mark Conner & The Engineering Academy at Hoover High School for the 12th Year. Engineering Design and Entrepreneurship is already identified as part of the subjects (http://www.nassme.org/2007ACDM/alabama.pdf). The University of New Brunswick has established a very comprehensive minor in entrepreneurship in Engineering. The University of Calgary has a very comprehensive program at all levels, including the program with engineering. This university has very strong links with the community. It is also a long-term leader across Canada in Entrepreneurship Education (Loucks, et al., 2000).
The continuation of Table 1 is found in Table 2 but this time, only two headings remain, the Asia-Pacific & Oceanic, and United States of America. Europe and Canada are temporarily disregarded in this table as there were no entries yet.

### Table 2

**Regional and Global Engineering and Entrepreneurship Perspective**

<table>
<thead>
<tr>
<th>Asia-Pacific &amp; Oceanic</th>
<th>United States of America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regarding Entrepreneurs and Entrepreneur Education in Japan, the following points were tackled:</td>
<td>* The business plan competitions were more prevalent after 1992 based on Kauffman Center for Entrepreneurial Leadership Staff or KCELS (2001) paper.</td>
</tr>
<tr>
<td>• types of Japanese entrepreneurs;</td>
<td>* Prior to 1992, only a handful of universities participated.</td>
</tr>
<tr>
<td>• the absence of entrepreneur-teachers/mentors;</td>
<td>* By 2001, many schools already offer internal business plan competitions as part of their entrepreneurship programs, while some expand participation with regional, national and international competitions.</td>
</tr>
<tr>
<td>• applying western case studies to Asian contexts;</td>
<td>Several national business plan competitions occur, including undergraduate contests at:</td>
</tr>
<tr>
<td>• addressing philosophical differences; and</td>
<td>• Ball State University</td>
</tr>
<tr>
<td>• generating demand for graduates (Dasher, 2003).</td>
<td>• Miami University of Ohio</td>
</tr>
</tbody>
</table>

Asia presents a number of common challenges to entrepreneurs. The programs have more or less dealt with these six challenges identified as:

(a) lack of market access for start-ups in Japan;
(b) unsophistication of venture investors (there is venture money but it has not forced the quality of business plans that are seen in the US);
(c) importance of personal connection above the quality of business plans, a problem especially in China;
(d) Asia tends to lack a supporting infrastructure;
(e) the lack of talented managers is acute in China; and
(f) there is a social taboo that stems from Confucian ideals against youthful leadership (Dasher, 2003).

Three initiatives mentioned in the National University of Singapore (NUS) initiatives to prepare student for the knowledge economy:

*NUS Enterprise* (encompassing experiential entrepreneurial education, industry engagement and partnership, and entrepreneurship support); *
*NUS Engineering Revamp* (like the establishment of Design-centric Engineering Curriculum to foster creativity, innovation, systems thinking, and thinking-outside-the-box culture); and *
*Leveraging on Industrial Design* (Tan, 2009).

The Economic Contribution of SMEs of 5 selected Asian countries (Yap, 2010) recognized Japan with the highest contribution to employment, followed by Korea, Malaysia, Thailand, and Philippines (UNCTAD Report, 2003 as cited in Yap, 2010).

In terms of status of SMEs, Yap (2010) cited the 4 Asian countries in 2006 identified with potential contribution to domestic economy. Japan (55.3%) which exceeds South Korea (49.1%) in contribution to GDP by 6.2%. Malaysia (32%) shows greater potential than Taiwan (n/a).

*Australia*

Outcomes-based education is not a single idea or set of procedures. Rather, outcomes-based education is like democracy—there are many different versions practiced in different ways in different places, all with the label outcomes-based education (Lawson, & Williams, 2007)

An estimated 50 universities and colleges have entrepreneurship courses and programs within engineering schools. Among those that have joint entrepreneurship programs with engineering schools are Carnegie Mellon University, the University of Iowa and the University of Minnesota (Vesper, Gartner, 1999 cited in REE USA, 2003).

Baylor University has long been a pioneer in the world of entrepreneurship education. While the breadth and depth of learning opportunities have expanded dramatically since Baylor began offering an undergraduate entrepreneurship major in 1977. The underlying purpose of the entrepreneurship program has remained constant: to foster the entrepreneurial spirit in all students (http://entrepreneuredu.org/undergrad-model-programs/item/121-fostering-lives-of-significance-in-a-world-of-opportunity).

California State Polytechnic University, Pomona is committed in providing quality service learning opportunities for students from all majors, and the College of Engineering is diligently working toward achieving this goal (Fan, Mariappan, & Monemi, 2005).

Princeton University in New Jersey has Entrepreneurial Engineering as part of its various program offerings (http://commons.princeton.edu/kellercenter/courses/overview.html) which is uniquely a Princeton way.
Examination of the different curriculum frameworks in the Australian States and Territories shows this to be the case. For all show some influence of principles of outcomes-based education (Lawson, & Williams, 2007).

Many engineering programs have recently added courses and material on “engineering entrepreneurship”, particularly in the Department of Mechanical Engineering of the University of Texas at Austin (Nichols, & Armstrong, 2003).

At the University of Colorado at Boulder (Sullivan, et al., 2001), the invention and innovation course for engineering students cultivates an understanding of the entrepreneurship and invention world through a hands-on introduction to product design and development.

Many universities successfully accomplish their primary mission of teaching and/or research, and yet have not established or nurtured a tradition of new venture creation (lack of entrepreneurial tradition) based on those teaching and research successes (Vickers, Salamo, Loewer, & Ahlen, 2001).

In Table 3, Europe resurfaced alongside Asia-Pacific & Oceanic, containing the last few entries that comprise the continuation of Tables 1 and 2

| Philippines: |
| University of the Philippines College of Engineering has Technology Entrepreneurship as elective subject (http://www.yugatech.com/blog/entrepreneur/technology-entrepreneurship-class-in-up, 2008). |
| De La Salle University has Bachelor of Science in Industrial Management Engineering minor in Service Management. This program prepares the students to pursue a career as Industrial Engineers (IEs) or to become entrepreneurs (www.dlsu.edu.ph, 2010). |
| Majority of engineering schools in the Philippines do not offer entrepreneurship as subject in engineering programs. Engineering Economy and Engineering Management are common courses in engineering. IE program has Accounting, Finance, and Marketing courses which are business-related but are not totally entrepreneurship focused. |

| Europe |
| There were 44 Policy recommendations by Wilson (2008) tackling any of these 14 clusters reformatted for this presentation: (a) general entrepreneurship exposure; (b) SME management; (c) sustainability and growth of businesses; (d) high curriculum outcomes measurement; (e) clear and attainable objectives; (f) activities responsive to local market needs and context; (g) integrated curriculum for multi-disciplinary learning environment; (h) entrepreneurship as mandatory course; (i) develop high-quality local content, case studies, and course materials that can be shared in international level; (j) promote learning by doing; (k) encourage research-oriented entrepreneurship centres; (l) support teacher workshops and trainings, incentives, rewards; (m) local companies involvement and recognition; and (n) tax incentives for donations to university funds. |

At TIP:  
- From CHED CMOs (not exactly entrepreneurship focus) to Institutional Learning Outcomes to Program Learning Outcomes to Course Learning Outcomes (down to Units and then Lessons in detail)  
- Weekly Lesson Activity Plan (WLAP) intensive seminar and preparation  
- Student Projects & Activities  
- Powerpoint Presentation (as Tool) Seminar and Contest  
- OBTL Methodology (as Tool) implementation  
- TIP Graduate Profile and Industry-Desired Competencies (TIP Research Group, 2010) are also incorporated in the course level agenda on a phase-planning basis  
- Faculty Research Contest to expand knowledge and application findings  

A study on Entrepreneurship Education was conducted to assess the state of entrepreneurship education in higher education institutions (HEIs) also in Europe, comparing it to developments in the United States and outlining a set of recommendations (above cell) for universities and policy makers. Comparisons include the differences in definition between entrepreneurship and SMEs, multidisciplinary learning, academic and business links, quality entrepreneurship curricula, and the role of entrepreneurship within the university (Wilson, 2008).
Table 4 shows the Entrepreneurship Framework, a format restructured for this study. This framework shows the Activities at the 3rd column to the right. As a start-up, seminar/workshop clinics, forum, networking, and entrepreneurship course are geared to create awareness & spark awareness among NUS Students, Professors, and Alumni. Together with other initiatives, Research on Spin-offs is done to support interest. Research and Development occur during autonomous spin-offs.

Table 4

<table>
<thead>
<tr>
<th>Target Groups</th>
<th>Key Nurturing Roles</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire National University of Singapore (NUS) Community of Students, Professors, Alumni</td>
<td>Create Awareness &amp; spark interest</td>
<td>Techno-Venture Forum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Faculty Networking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Introductory Course on Entrepreneurship</td>
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<tr>
<td></td>
<td></td>
<td>Start-up @ Singapore</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Seminar/Workshop clinics</td>
</tr>
<tr>
<td>Those interested in learning activities (students taking Entrepreneurship courses, workshops)</td>
<td>Support pursuit of interest</td>
<td>Techno-venture Forum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Experience-based learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Start-up @ Singapore</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Technopreneurship minor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Training workshop for faculty</td>
</tr>
<tr>
<td>New Start-ups by NUS students, professors &amp; Alumni</td>
<td>Catalyze &amp; Incubate Start-up</td>
<td>Techno-venture Forum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Experience-based learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Research on spin offs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mentoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incubator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seed fund support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Training workshop for faculty</td>
</tr>
<tr>
<td>Existing NUS Start-ups, Pre-external funding spin-offs</td>
<td>Mentor &amp; graduate</td>
<td>Technopreneurship minor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R&amp;D collaboration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tech licensing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technology showcase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Research on spin offs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mentorship</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incubator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seed fund support</td>
</tr>
<tr>
<td>Autonomous Spin-offs</td>
<td>Research collaboration</td>
<td>Mentoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incubator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Seed fund support</td>
</tr>
</tbody>
</table>

Source: Reformatted from NUS Deputy President & Provost Prof Tan Eng Chye pdf presentation

On the Local (Philippines) Focus of Engineering Education

Practices on delivery of engineering instruction at TIP.

The Weekly Lesson Activity Plan (WLAP) is periodically updated after assigning the course to the teachers in accordance with the OBTL structure, the flow in Figure 1, as well as the overall compliance to CHED CMOs.
The results of the TIP Graduate Profile and Industry-Desired Competencies (TIP Research Group, 2010) are also incorporated in the course level agenda on a phase-planning basis and not on a one-shot, one-time period of development. There are on-the-job trainings with the supervision of their Practicum Coordinator, Group Projects, Plant Visits, Field Trips, Outreach Projects, Research Projects, etc.

As technology is part of teaching aid, the powerpoint presentation is one of the technology-aided tools adapted at TIP. Seminars on powerpoint presentation were conducted among the teaching personnel to instill the habitual use of technology-aided methodology. Recent contests reflected the 4 types of powerpoint presenters such as: Chip Presenters (“cut-and-paste” collector); Dummy (proxy) Presenters; Script-Reader Presenters; and Master Presenters.

**On the current issues surrounding OBTL Methodology (Course Level) and OBE (Program Level).**

Using the 3-legged chair model (Figure 2), the ongoing OBTL project dissemination belongs to the right leg labeled as the Methods of delivering an Outcomes Approach. The Learning Outcomes without OBTL may dwindle in assessment from Norm-Referenced Type to Criterion-Referenced type (http://chiron.valdosta.edu/whuitt/col/measeval/crmref.htm). With the OBTL almost in place, all learning assessments are criterion-referenced.

OBE is not yet fully realized in the current engineering curriculum system since the current thrust now is in the Methods of Delivery (OBTL) and not much on the Curriculum Mandate (Figure 2). There is OBE because there are desired outcomes but the thrust is more on employment not on entrepreneurial skills development (Table 3).

**On entrepreneurship.**

Dr. Jousef Yap (personal speech, 2010) said that instead of the Philippines being over reliant on consumption, it needs regional rebalancing wherein not all raw materials are imported neither going totally dependent on imports. For it to be economically inclusive, balanced, and sustained, the playing field must: increase investors in response to better infrastructure; revive the flying geese model; and link the Multinational Businesses to the SMEs.

Any engineer is being given the hint to go into entrepreneurship if employment is unkind or if interest calls for it by finding the niche among the vast areas of potential SMEs. In this way, entrepreneurship and engineering are no longer separate discipline neither causing career shift among engineers but rather, as integrated disciplines (just like what happened to the related experiences of regional and global engineering schools in Tables 1, 2, and 3).

In Table 1.1, the Philippines is not included in the comparison of SMEs (Yap, 2010) with potential contribution to economy. Table 1.2 also confirms that entrepreneurship has NOT yet fully penetrated the local engineering program. This country, if willing to improve its competitiveness, may also indulge in SMEs. But the seed has to start in the educational system to instill entrepreneurial skills (Sidhu, et al., 2010; Bae, 2004; Dabbagh, et al., 2006; Wilson, 2008) for the future engineers.

This concept for the entire engineering curricula is not common locally, therefore, resistance or clash of values and expectations (Carlson, 1988 cited in Standish-Kuong, & Rice, 2002) are expected.
On the potential alternative on how to catch up with the global and regional engineering curriculum trends.

A Business Plan Contest focusing on SMEs Module Development is a potential replacement for powerpoint competition. Literature on Business Plans in Europe and America as cited in the previous pages strengthen and boost the viability of this suggestion.

If researches at TIP are aligned to the researchers’ specialization, maybe it is not a burden if engineer-researchers tie-up with business educators/practitioner/owners (Wilson, 2008; Standish-Kuon, & Rice, 2002; KCELS, 2001; www.entrepreneuredu.org; & UNLV in www.docstoc.com/docs) and create SME Modules.

Table 5 tabulates the features and characteristics of the Powerpoint Contest against the Business Plan Contest.

### Table 5
**Comparison of Powerpoint Presentation Contest Against Business Plan Contest**

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Powerpoint Presentation Contest</th>
<th>Business Plan Contest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandate</td>
<td>On the Methodology of Instruction</td>
<td>On the Curriculum</td>
</tr>
<tr>
<td>Number of Participating Departments</td>
<td>Seven (7) Engineering Departments of Engineering subjects presented</td>
<td>7 or more (with Business Education involvement) or less than 7 as it can be done by tandem with Engineering</td>
</tr>
<tr>
<td>Average Usage of the contest entry</td>
<td>5 (out of 7) times; once per entry; sometimes, periodic for a single entry in the whole semester</td>
<td>Throughout the semester as focus topic when situational examples are needed</td>
</tr>
<tr>
<td>Scope</td>
<td>Per Lesson; Per Unit or on a Per Course Overview</td>
<td>Per Course; Per Program</td>
</tr>
<tr>
<td>Coverage</td>
<td>Tendency to be fragmented and/or specific; Unrelated topics per presentation</td>
<td>Cyclical and continuity or interface of topics throughout the semester or through the end of curriculum</td>
</tr>
<tr>
<td>Maximum Contribution Impact</td>
<td>Course-level</td>
<td>Program-level</td>
</tr>
<tr>
<td>Outcomes affected</td>
<td>Specific; Lesson or Unit Outcomes</td>
<td>Varied/Multiple and holistic; Exit Outcomes</td>
</tr>
<tr>
<td>Influence</td>
<td>Single Curriculum</td>
<td>Integrated Curriculum/Contextual Instruction</td>
</tr>
<tr>
<td>Effort Needed</td>
<td>Individual Effort</td>
<td>Dual or Collective Effort</td>
</tr>
<tr>
<td>Other Uses</td>
<td>Paper Presentation; Meeting or Activity Presentations</td>
<td>Sequencing of Modules per semester; Decision-making on simultaneous offerings; update of syllabus and WLAP</td>
</tr>
</tbody>
</table>
The Mechanics of the Contest and other policies as to what should be the focus of SMEs (UNIDO, 2003; UNIDO, 2002; Rowley, 2009; Yamazawa, 1990; Yap, 2010) for the period shall be studied, drafted, and implemented by a Committee. Variable incentives are perceived depending on the scope and contribution of the business plan.

Selection of winning Modules shall follow separate criteria than the existing Best Research Criteria. Judges must be of substantial background and experience in entrepreneurship (UNLV in www.docstoc.com/docs) related to the topic entries, in a top management position (not a supervisor in one department). Another judge should have a technical background related to the topic being judged.

The module, once judged, shall constitute as future reference to be injected in the lessons through example and situational citations or classroom exercises. This platform shall be the reverse of the NUS initiative (Table 4) wherein their research collaboration happens during the autonomous spin-offs period.

Singapore being ranked as No.1 in Ease of Doing Business, Employing Workers, and in Trading Across Borders (World Bank’s Doing Business Report, 2008) has already attained enterprising culture. The Philippines needs more concrete and well-planned mobilization. In a country with lagging economy and engineering integration with entrepreneurship, the research collaboration is better done at the upstream of the process (Create Awareness Part, Table 4).

Conclusion

WLAP preparation is already synchronized with OBTL requirements at the course level. Powerpoint Contest shall be replaced by Business Plan Contest. Business Plan Contest is a potential alternative that can hit through the attainment of a massive, concrete Exit Outcomes leaning towards entrepreneurial skills at the program level. Business Plan/Module Development is not simply aiming to the generic skills of engineering students/graduates. Skills continuity that are not covered by elective subjects offering, fragmented lecture or case study, may be tapped via the Curriculum Mandate, injecting the continuity of knowledge and skills at the program level.

Practical and realistic SME business plans attuned to the demands of the changing times shall be embedded in the engineering-entrepreneurship curriculum as guided by OBE.

Graduates or undergraduates may at least experience and learn the outcomes on a cycle-basis and have a tour of the overview of the SME possibilities.

Recommendation

The Business Plan Contest could be: a potential tool to strengthen the Curriculum Mandate; new venture into another sphere of research output, format, and focus; one way of finding means to integrate engineering curriculum with entrepreneurship; or used in criteria setting of outcomes.

The number of modules per Business Plan depends on the business coverage provided that one module is equal to one course.

The Engineering departments must identify the potential SMEs. One program may have one or more categories.

The implementation of business plan modules may be spread in one or more semesters depending on the scheduling of courses in the curriculum and course offering policies.

The Strategic and Policy Planning of Integration of Entrepreneurship into the next cycle of Engineering Curriculum Review shall be conducted by the Academic Advisory Board.
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Yap, J. (2010). Economic outlook and prognosis in different sectors: Industrial, agriculture and services (Speech). Philippine Institute of Industrial Engineers General Membership Meeting, Mandarin Hotel, Makati City
Market Dynamics of ANP Negros Showroom: Drivers of Innovation

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Abstract

Continuous quest for development is an active word for passion among entrepreneurs. With the global influx of technology, and mobility of market, the challenges are endless for entrepreneurs here and abroad. But it’s what makes an entrepreneur the citizen of 21st century. Vadim Kotelnikov (2001) claims that entrepreneur is a person who habitually creates and innovates to build something of recognized value around perceived opportunities. Association of Negros Producers (ANP) Negros Showroom is declared by the Bureau of Domestic Trade Promotions as the No. 1 trade house in the Philippines. The Negros Showroom displays the products of the ANP member-producers and serves as their business center (Association of Negros Producers [ANP], 2007). Their penchant for recognition and perception of opportunities propel them to explore the unknown, the unpredictable and the surface to the limitless discovery of learning, and fulfilling their passion. They are unstoppable, pattern-breakers, and empathic collaborators of resources and networks. Despite the changing planes of market’s taste and preferences, reach and segmentation, entrepreneurs are naturally at pace with market dynamics. These dynamics respond to what challenges the ANP members to innovate: product’s price, quality, and design.

Keywords: market dynamics, entrepreneurs, innovation, product design
Background

The Association of Negros Producers (ANP) is a Business Service Organization (BSO), geared towards business development of micro-small and medium enterprises (MSMEs) advocating poverty alleviation through entrepreneurship (ANP, 2007).

As marketing channel of MSME, it showcases one of MSMEs’ role and importance, as highlighted by the Department of Trade and Industry: “…(they) are quick in assimilating new design trends, developing contemporary products, and bringing them to the marketplace ahead of the competition. MSMEs tend to be far more innovative in developing indigenous or appropriate technology, which may be grown later into pioneering technological breakthroughs” (DTI, 2008).

The momentum in the production and favourable acceptance of ANP products reflect in the historical gross sales during trade fairs in which more likely such marketing channel produce much exposure to the products and operations of ANP members. On the first decade of trade fairs, 1988-1997, an average of Php4.78M to Php8.53M in 1998-2007 with approximately equal number of participants in 5-6 day events (ANP, 2008). This continues to resonate and confirmed in the State of the Sector Report on Philippine Houseware 2005 by Canadian International Development Agency (CIDA), it noted that 85% of Negros Occidental Houseware producers rely on market export development from trade fairs (Agriteam Canada Consulting, Ltd., 2006, as cited in Philippine Housewares Industry).

Product development results to continuous exposure of the industries among designers (65%), buyers (50%), trade fairs (45%), publications (40%) and the Internet (15%) (Agriteam Canada Consulting, Ltd., 2006). Designers themselves noted on their indispensable presence in the growth of MSME in the country that, “…to satisfy ever-changing consumer demands for new products and constantly improve existing ones is the driving force behind designers and manufacturers drive for continuous product development...It is a business approach that makes products more sustainable, design oriented, and commercially viable” (Product Development and Design Center of the Philippines, 2008).


The entrepreneurial passion of ANP members are complemented with the continuing assistance and partnership of government and non-government organizations. One of the ANP members, Virgie’s Homemade Products has attested to DTI’s interventions, in response to its continuing mandate on MSME. DTI covers the major aspects of business operations, organization/management, marketing, production, and finance, and more importantly was the interventions of the DTI in her trade fair participations. Aside from joining the annual ANP Fair, Virgie’s also participated in the National Trade Fair (NTF) and in the International Food Exposition (IFEX) where it was able to launch properly its products, met new buyers and negotiated with the country’s consolidators (PromdiLiving, 2010).

Market dynamics are intricate and the influential factors are so diverse, depending on the kind of business’ elasticity to supply-prevalence (i.e, raw materials and logistics) and demand-requirements. However, the commonality of these classic forces in business, demand and supply, are more likely responsive to breakthroughs, and simply put as innovation. In this study, ANP products respond accordingly to design, quality, and price to drive innovation.

Design is the tangible factor of innovation. Utterback, et.al., claim that when an innovation is inspired by design, it transcends technology and utility. Design is a sensible manifestation by which a product continuously evolves and customizes to answer the need of its base and growing customers. This seamlessly ushers quality to design when a product gives delight and satisfaction to customers. As Gupta (2010) plainly states, “it is a given.” Gupta considers innovation as face-off of quality as he related innovation-led businesses inherently knew the customer’s pulse and responded accordingly. Price is the response determinant of customers to user-ownership from producer’s concept-ownership.
positioning to correspond to customer’s purchasing power so he can afford product design and quality is the encompassing demand-pull theory of innovation.

ANP showroom has witnessed the entries and exits of products aside from their sales performance, and its ability to meet consumer’s taste and preference. The evolution of products are due to the bounty and availability of raw materials and designers who are inherently creative and innovative. Agriteam published Pearl 2 (2005) report on Houseware Sector noted “All of the Negros Occidental based firms surveyed indicated having their own resources for product development,… Majority (90%) base their designs on buyers’ specifications.”

Thus, ANP provides significant venue for its member-producers to pursue innovation by giving distinct recognition: the Bulawan Awards. It is conducted to give due recognition to the ingenuity, creativity, industry and commitment of the Negrense producer. It intends to inspire manufacturers to create products that can enter the highly competitive domestic and international market (ANP, 2007).

With the evolving challenges in the local and export markets, ANP Showroom is steadfast to pursue its mission to advocate poverty alleviation through entrepreneurship by providing assistance in the breakthrough of market and product developments.

**Research Problem**

The study investigates the market dynamics of ANP Showroom with regards to the products’ price, design and quality as perceived by their customers. Specifically, it seeks to answer the following:

1. What are the preferences of the buying markets in terms of ANP Showroom products?
2. What is the buying markets’ perception of ANP Showroom products as to price, quality, and design?
3. Is there a significant difference among the preferences of the buying market in terms of ANP Showroom products?
4. Is there a significant difference among the buying markets’ perception of ANP Showroom products as to products as to price, quality, and design?

**Hypotheses**

The study of Market Dynamics of ANP Showroom: Drivers of Innovation has the following hypotheses:

1. There is no significant difference among the preferences of the buying markets in terms of ANP Showroom products.
2. There is no significant difference among the buying markets’ perception of ANP Showroom products as to price, quality, and design.

**Objectives of the Study**

Specifically, this study aims to:

4. Determine the local markets’ preference of ANP showroom products.
5. Find out the markets’ perception of ANP showroom products as to price, quality, and design.
6. Recommend market and product development as to the local markets’ preference on price, design, and quality.
Theoretical Framework

Market Dynamics in this study encompasses several theoretical approaches. More likely due to the operational infrastructure of ANP Showroom in which all member-producers showcase their products in a one-stop-shop, the principle of Minimum Differentiation by Howard Hotelling is the most appropriate. The dynamics of both buyers and suppliers respond to product differentiation as to proximity of location (Anderson, 1992). Andersons and his colleagues confirm the foregoing theory when “two products were collocated…firms will avoid…ruinous result by differentiating to retain market power attributable to location advantage… Getting closer to a rival provokes more intense price competition so firms differentiate in order to relax price competition, but getting close to a rival attracts more customers (Anderson, 2005).

With the nature of competition, literally under one roof, member-producers are periodically provided with assistance both from government and non-government agencies through operational aspects of general management, production, marketing, and finance. Thus, responses to the dynamic market environment, member-producers have applied instinctively the vertical product differentiation, an offshoot of Hotelling’s Minimum Differentiation and Lancaster’s characteristics model as manifested in the growth of annual trade fairs. The latter model, (product) characteristics exemplifies that “consumers care about the characteristics intrinsic to goods and purchase goods because they deliver the desired characteristic mix, adjusting appropriately for prices” (Anderson, 2005).

Figure 1. Operational Framework of the Study

Figure 1 presents the operational framework of the study using Hotelling’s Law on Minimum Differentiation. Preference of buying market is influenced to their matched-value on product’s price,
quality, and design from different identified industries: gifts & housewares, fashions, foods, furnitures & furnishings.

The study recognizes that the dependent variables: price, quality, and design. These are drivers of innovation upon the perception of customers. Their weight in the study is reflected to nominal scale responses. For price: affordability, to quality, and expensive. Quality is defined to be high or average. Lastly, design is differentiated as distinct or unique, preferred, functional, and fashionable. Appropriateness of moderator variables is applied. Thus, treatment of observed and expected frequencies from the responses would vary in respect to the degrees of freedom.

Methodology

A survey of 107 walk-in customers in a period of one month in the first quarter of the year was conducted in ANP showroom. The respondents were buying customers who were categorized as Bacolod City residents, foreign tourists, and balikbayan (a visiting/staying Filipino with foreign residency or workplace). The study applied a cross-sectional analysis which is a cohort that refers to the group of respondents who experienced the same event within the same time interval (Internet Center for Management and Business Administration, Inc.,2010; Shakla, 2008).

They were given a survey questionnaire to identify the product(s) they bought and indicate their perceptions as to price, quality, and design through nominal scale. Their responses (observed frequency = \( f_o \); expected frequency = \( f_e \)) were cross-tabulated in MS Excel. The nominal scale responses were treated through chi-square statistics \( \chi^2 \).

Results and Discussion

In this cohort data analysis of Market Dynamics of ANP Showroom, the Bacolod City residents (39%) patronize the products of Association of Negros Producers-Members; balikbayan (33%) comes close and foreign tourists (28%). By frequency count, products from Fashion Industry (47%) like T-shirts and accessories lead in the demand compared with Gifts and Housewares products (36%). Food, Furniture and Furnishings had the same level of demand (8%). The local markets are considered valuable to the producers who were engaging in export markets.

As presented in Table 1, the buying market preference across all products in the industries, resulted to statistically significant \( \chi^2 \) (6, 107) = 17.8, \( p = 12.59 \).

<table>
<thead>
<tr>
<th>Buying Market</th>
<th>Gifts &amp; Housewares</th>
<th>Fashion</th>
<th>Food</th>
<th>Furniture &amp; Furnishings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacolod Resident</td>
<td>21 15.31 2.12 14 19.63 1.61 4 3.53 0.06 3 3.53 0.08</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Tourist</td>
<td>2 10.93 7.30 21 14.02 3.48 4 2.52 0.86 3 2.52 0.09</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balikbayan</td>
<td>16 12.76 0.82 15 16.36 0.11 1 2.94 1.28 3 2.94 0.00</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total 39 50 9 9 107

Note: \( p<.05 \)
The succeeding results of the study present the responses of ANP market to the drivers of innovation: Price, Quality, and Design.

Price perception on affordability, reasonable to quality, and expensive attribute to market’s response in the creation of sales for ANP product. Thus, tables 2 to 4 highlight the nominal responses of the market.

Table 2
Results of Buying Market Preference of Product as to Affordable Price

<table>
<thead>
<tr>
<th>Buying Market</th>
<th>Gifts &amp; Housewares</th>
<th>Fashion</th>
<th>Food</th>
<th>Furniture &amp; Furnishings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$f_o$</td>
<td>$t_o$</td>
<td>$(t_o-f_o)^2/f_o$</td>
<td>$f_o$</td>
<td>$t_o$</td>
</tr>
<tr>
<td>Bacolod Resident</td>
<td>12</td>
<td>9.47</td>
<td>0.68</td>
<td>11</td>
<td>13.59</td>
</tr>
<tr>
<td>Foreign Tourist</td>
<td>1</td>
<td>7.10</td>
<td>5.24</td>
<td>16</td>
<td>10.19</td>
</tr>
<tr>
<td>Balikbayan</td>
<td>10</td>
<td>6.43</td>
<td>1.99</td>
<td>6</td>
<td>9.22</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>33</td>
<td>8</td>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

Note: p<.05

Responses from buying market indicate their perception as to product’s price: affordability, reasonable to quality, and expensive. More than half (64%) found the products bought from ANP showroom as affordable. Across industries, Bacolod residents (26%) regarded ANP products as affordable compared to foreign tourists (20%) and balikbayan (18%). Fashion Industry (31%) leads in the buying markets’ perception of product affordability; with gifts and housewares (21%) come to a close.

Results from the buying market preference as to product’s ‘affordable’ price in Table 2, shows that there is a significant difference, $\chi^2 (6, 68) = 16.5, p = 12.59$, among industries.

Table 3
Results of Buying Market Preference of Product as to ‘Reasonable to Quality’ Price

<table>
<thead>
<tr>
<th>Buying Market</th>
<th>Gifts &amp; Housewares</th>
<th>Fashion</th>
<th>Furniture &amp; Furnishings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$f_o$</td>
<td>$t_o$</td>
<td>$(t_o-f_o)^2/f_o$</td>
<td>$f_o$</td>
</tr>
<tr>
<td>Bacolod Resident</td>
<td>5</td>
<td>3.50</td>
<td>0.64</td>
<td>2</td>
</tr>
<tr>
<td>Foreign Tourist</td>
<td>1</td>
<td>1.00</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Balikbayan</td>
<td>2</td>
<td>3.50</td>
<td>0.64</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>7</td>
<td>1</td>
<td>16</td>
</tr>
</tbody>
</table>

Note: p<.05

Respondents who bought products from Food sector did not indicate their perception in the survey gathered, thus, they were not considered in the tabulation of data. Out of buying market sample size, 15% responded. Table 3 shows the data to have no significant difference, $\chi^2 (4, 16) = 3.24, p = 9.49$ in product’s price reasonable to quality among the products purchased across all industries.
Consumer response to price is most often observable among staple and novelty products. The generational presence of staple consumer goods; discussions on news headlines on their changes; and the like. Rockbridge Associates, Inc. noted the Dutch economist, Peter van Westendorp who authored Price Sensitivity. “The method is based on the assumption that buyers judge quality (which can include functionality and effectiveness) by price, especially in an environment where decisions are complex” (Rockbridge, 2009).

Table 4

Results of Buying Market Preference of Product as to Expensive Price

<table>
<thead>
<tr>
<th>Buying Market</th>
<th>Gifts &amp; Housewares</th>
<th>Fashion</th>
<th>Food</th>
<th>Furniture &amp; Furnishings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacolod Resident</td>
<td>4 2.43 1.01 1 3.04 1.37 1 0.30 1.59 1 1.22 0.04 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Tourist</td>
<td>0 2.43 2.43 4 3.04 0.30 0 0.30 0.30 3 1.22 2.61 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balikbayan</td>
<td>4 3.13 0.24 5 3.91 0.30 0 0.39 0.39 0 1.57 1.57 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>8 10 1 4</strong></td>
<td><strong>23</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: p<.05

Expensive price is known to have inverse relationship with demand. The buying market (21%) found the products bought were expensive. ANP showroom products have no significant difference as to this price perception, $\chi^2 (6, 23) = 12.2, p = 12.59$ (see Table 4) among all industries.

Price perception relative to purchase decision of the buyers. Mondejar-Jimenez, et.al. (2008) cited Lowengart (2002) theoretical concept of reference price is therefore discussed in two directions: on the one hand, the price perception, and on the other, the context of the prices coexisting when the consumer has to evaluate a price, or the consumer’s purchase experience.

Tables 5 and 6 present the responses of the market’s perception to Quality: High or Average.

Table 5

Results of Buying Market Preference of Product as to High Quality

<table>
<thead>
<tr>
<th>Buying Market</th>
<th>Gifts &amp; Housewares</th>
<th>Fashion</th>
<th>Furniture &amp; Furnishings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacolod Resident</td>
<td>10 6.97 1.32 7 9.87 0.84 1 1.16 0.02 18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Tourist</td>
<td>2 8.52 4.99 17 12.06 2.02 3 1.42 1.76 22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balikbayan</td>
<td>12 8.52 1.43 10 12.06 0.35 0 1.42 1.42 22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>24 34 4</strong></td>
<td><strong>62</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

More than half (58%) of buying customers of ANP showroom attributed the products bought as High Quality. However, none among the food buyers (8%) indicated their perceptual response. Table 5 indicates a high significant difference of buying market on their regard to products as high quality, $\chi^2 (4, 62) = 14.14, p = 9.488.$
A substantial number of buying market (41%) consider the products bought at ANP Showroom as average in Quality. The food buying market (100%) noted that they bought products from this sector and regard them as average in quality. Table 6 shows however has no significant difference of buying market on their regard to products from all industries as average in quality, $\chi^2 (6, 44) = 11.36, p = 12.592$.

In this succeeding presentation, food sector is not included due to lack of appropriateness to qualify for product design evaluation.

Table 7

<table>
<thead>
<tr>
<th>Buying Market</th>
<th>Gifts &amp; Housewares</th>
<th>Fashion</th>
<th>Food</th>
<th>Furniture &amp; Furnishings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacolod Resident</td>
<td>9  5.51  2.21</td>
<td>4  8.57  2.44</td>
<td>2  0.92  1.27</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Foreign Tourist</td>
<td>1  5.88  4.05</td>
<td>14  9.14  2.58</td>
<td>1  0.98  0.00</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Balikbayan</td>
<td>8  6.61  0.29</td>
<td>10  10.29  0.01</td>
<td>0  1.10  1.10</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>18  28  3</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: $p<.05$

Nearly half of the respondents (47%) found the products bought from ANP showroom as distinct and unique. Creusen and Schoormans (2005) expressed that the design of a product determines consumers’ first impression of the product and quickly can communicate product advantage. Table 7 presents that $\chi^2 (4, 49) = 13.95, p = 9.488$, indicating there is significant difference of products’ uniqueness and distinction among all industries as perceived by the buying market.
Table 8

Results of Buying Market Preference of Product as to Highly Preferred Design

<table>
<thead>
<tr>
<th>Buying Market</th>
<th>Gifts &amp; Housewares</th>
<th>Fashion</th>
<th>Furniture &amp; Furnishings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$f_0$</td>
<td>$f_e$</td>
<td>$(f_0-f_e)/f_e$</td>
<td></td>
</tr>
<tr>
<td>Bacolod Resident</td>
<td>2</td>
<td>2.14</td>
<td>0.01</td>
<td>5</td>
</tr>
<tr>
<td>Foreign Tourist</td>
<td>0</td>
<td>1.29</td>
<td>1.29</td>
<td>3</td>
</tr>
<tr>
<td>Balikbayan</td>
<td>7</td>
<td>5.57</td>
<td>0.37</td>
<td>13</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9</td>
<td>11</td>
<td>1</td>
<td>21</td>
</tr>
</tbody>
</table>

Note: p<.05

Table 8 presents 20% of buying market preferred highly the design of the products bought at ANP showroom. The responses show that statistically, there is no significant difference of choice or preferred design among the products bought from ANP, hence $\chi^2(4, 21) = 4.11$, p = 9.488.

Table 9

Results of Buying Market Preference of Product as to Functional Design

<table>
<thead>
<tr>
<th>Buying Market</th>
<th>Gifts &amp; Housewares</th>
<th>Fashion</th>
<th>Furniture &amp; Furnishings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$f_0$</td>
<td>$f_e$</td>
<td>$(f_0-f_e)/f_e$</td>
<td></td>
</tr>
<tr>
<td>Bacolod Resident</td>
<td>5</td>
<td>3.33</td>
<td>0.83</td>
<td>10</td>
</tr>
<tr>
<td>Foreign Tourist</td>
<td>1</td>
<td>3.33</td>
<td>1.63</td>
<td>10</td>
</tr>
<tr>
<td>Balikbayan</td>
<td>3</td>
<td>2.33</td>
<td>0.19</td>
<td>7</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9</td>
<td>13</td>
<td>5</td>
<td>27</td>
</tr>
</tbody>
</table>

Note: p<.05

Table 9 portrays 25% of buying market noted the functionality of design of the products bought at ANP showroom. The responses show that statistically, there is no significant difference of functional design among the products bought from ANP, hence $\chi^2(4, 27) = 5.13$, p = 9.488.

Table 10

Results of Buying Market Preference of Product as to Trendy Design

<table>
<thead>
<tr>
<th>Buying Market</th>
<th>Gifts &amp; Housewares</th>
<th>Fashion</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$f_0$</td>
<td>$f_e$</td>
<td></td>
</tr>
<tr>
<td>Bacolod Resident</td>
<td>4</td>
<td>3.67</td>
<td>7</td>
</tr>
<tr>
<td>Foreign Tourist</td>
<td>0</td>
<td>1.00</td>
<td>3</td>
</tr>
<tr>
<td>Balikbayan</td>
<td>6</td>
<td>5.33</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

Note: p<.05
Table 10 presents 25% of buying market noted the functionality of design of the products bought at ANP showroom. In these data, buying market of furnitures and furnishings did not indicate their responses as to this product design aspect. The responses show that statistically, there is no significant difference of trendy design among the products bought from ANP, hence $\chi^2 (2, 30) = 2.78, p = 5.991$.

**ANP Showroom Members**

From its initial membership base of 47 producers, ANP now boasts of 79 member-producers who have realized the importance of their economic contribution and thus, continue to aspire for the expansion of their market niche to further strengthen their production base.

For nearly 25 years of existence, the association evolves. Some member-companies also ceased to operate, while others opted to resign from their membership in the association. Direct and indirect exporters cease in their operations mostly due to difficult competition in the global market. The low cost of production from countries like China gave our local producers hard time to compete in the international market. Issues on high cost of labour, absence of international port in the province of Negros Occidental, and lack of facilities and technology were among the major reasons for these exporters to stay (ANP, 2008; Agriteam Canadad Consulting, Ltd., 2005).

Faithful to the organization’s vision-mission statements, the showroom does not charge rental fees to its member, rather 30% of gross sales among members.

The showroom management continues to launch several programs to battle these problems such as mentoring, product development assistance, loan assistance, trainings, and seminars.

While the export industry is having difficulty in the global competition, many ANP member-organization found rescue in the local market. Companies who had position themselves and found a niche in the local market who were likely less affected by global financial crisis.

This is an observed market conditions due to the consistent top gross sellers in the showroom (Table 11).

### Table 11
**ANP Showroom Annual Top Gross Sellers for the Five-Year Period (2004-2008)**

<table>
<thead>
<tr>
<th>Rank</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Azatri</td>
<td>Azatri</td>
<td>Azatri</td>
<td>Azatri</td>
<td>Azatri</td>
</tr>
<tr>
<td>2</td>
<td>Tumandok Crafts</td>
<td>Babylans Cococrafts</td>
<td>Babylans Cococrafts</td>
<td>Babylans Cococrafts</td>
<td>Vito Prints &amp; Pieces</td>
</tr>
<tr>
<td>3</td>
<td>Babylans Cococrafts</td>
<td>Manggad sang Pilipinas</td>
<td>Crisvil Enterprise</td>
<td>Turnandok Crafts</td>
<td>Babylans Cococrafts</td>
</tr>
<tr>
<td>4</td>
<td>Manggad sang Pilipinas</td>
<td>Crisvil Enterprise</td>
<td>Turnandok Crafts</td>
<td>Manggad sang Pilipinas</td>
<td>Babylans Cococrafts</td>
</tr>
<tr>
<td>5</td>
<td>Sweetgreens</td>
<td>Tumandok Crafts</td>
<td>Mikeys</td>
<td>Crisvil Enterprise</td>
<td>Crisvil Enterprise</td>
</tr>
<tr>
<td>6</td>
<td>Mikeys</td>
<td>Sweetgreens</td>
<td>Vito Prints and Pieces</td>
<td>Mikeys</td>
<td>Vicmik</td>
</tr>
<tr>
<td>7</td>
<td>Vicmik</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>SDT Handicrafts</td>
<td>Virgies Homemade</td>
<td>Sweet Greens</td>
<td>Sweet Greens</td>
<td>Virgie’s Homemade</td>
</tr>
<tr>
<td>9</td>
<td>Silay Export</td>
<td>Barrio Lass</td>
<td>Nonoy’s Craft</td>
<td>Vicmik</td>
<td>Kikulo Crafts</td>
</tr>
<tr>
<td>10</td>
<td>3As Handicrafts</td>
<td>Silay Export</td>
<td>Virgie’s Homemade Products</td>
<td>Virgie’s Homemade Products</td>
<td>Mikey’s</td>
</tr>
</tbody>
</table>

Source: ANP (2008)

Table 12 reflects the industry as to where each top gross sellers/producers presented in Table 11. Further the data presented in the table below shows the dominance of industries in their sales performance.
Table 12  
Top Gross Sellers classified as to Industries for the Five-Year Period (2004-2008)  

<table>
<thead>
<tr>
<th>Rank</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fashion</td>
<td>Fashion</td>
<td>Fashion</td>
<td>Fashion</td>
<td>Fashion</td>
</tr>
<tr>
<td>2</td>
<td>Furniture &amp; Furnishings</td>
<td>Furniture &amp; Furnishings</td>
<td>Furniture &amp; Furnishings</td>
<td>Furniture &amp; Furnishings</td>
<td>Gifts &amp; Housewares</td>
</tr>
<tr>
<td>3</td>
<td>Furniture &amp; Furnishings</td>
<td>Furnishings</td>
<td>Furnishings</td>
<td>Furnishings</td>
<td>Furnishings</td>
</tr>
<tr>
<td>4</td>
<td>Gifts &amp; Housewares</td>
<td>Gifts &amp; Housewares</td>
<td>Gifts &amp; Housewares</td>
<td>Gifts &amp; Housewares</td>
<td>Furniture &amp; Furnishings</td>
</tr>
<tr>
<td>5</td>
<td>Gifts &amp; Housewares</td>
<td>Fashion</td>
<td>Furniture &amp; Furnishings</td>
<td>Gifts &amp; Housewares</td>
<td>Gifts &amp; Housewares</td>
</tr>
<tr>
<td>6</td>
<td>Fashion</td>
<td>Furniture &amp; Furnishings</td>
<td>Fashion</td>
<td>Fashion</td>
<td>Fashion</td>
</tr>
<tr>
<td>7</td>
<td>Fashion</td>
<td>Gifts &amp; Housewares</td>
<td>Gifts &amp; Housewares</td>
<td>Fashion</td>
<td>Fashion</td>
</tr>
<tr>
<td>8</td>
<td>Gifts &amp; Housewares</td>
<td>Gifts &amp; Housewares</td>
<td>Gifts &amp; Housewares</td>
<td>Gifts &amp; Housewares</td>
<td>Food</td>
</tr>
<tr>
<td>9</td>
<td>Gifts &amp; Housewares</td>
<td>Housewares</td>
<td>Housewares</td>
<td>Gifts &amp; Housewares</td>
<td>Fashion</td>
</tr>
<tr>
<td>10</td>
<td>Gifts &amp; Housewares</td>
<td>Housewares</td>
<td>Housewares</td>
<td>Food</td>
<td>Food</td>
</tr>
</tbody>
</table>

In 2008, products from Fashion industries (50%) dominate the top 10 gross sellers in ANP showroom; where Azatri the top notcher, is a part of. From the latest annual sales performance of ANP Showroom, the study supports the tangible indicator from customers’ product preference: sales.

Implications of the Findings of the Study

1. The null hypothesis is rejected when the study resulted to a significant difference among the preferences of the buying markets in terms of ANP Showroom products across all sectors/industries. Fashion and Gifts and Housewares products are highly preferred by ANP market and validated by the top gross sellers in the year of 2008. The products are personalized and customized in value, thus buying decision process is relatively easy.
2. Among the perceptual factors on price, affordability resulted to significant difference among industry products. The market showed price sensitivity to products of different industries: fashion, gifts and housewares, furnitures and furnishings, and food. This could also be attributed to convenience of immediate comparison of product’s price among similar products showcased in one venue. Accordingly, high in quality and distinctiveness in design showed significant difference among the buying markets’ perception of ANP Showroom products. These latter two factors are quite challenging for ANP producers due to the growing consciousness of customers to quality: awareness/familiarity of products made available by department stores, direct selling companies, proliferation of kiosk-boutiques.

Conclusion

The study highlighted the importance of buyers’ preferences constrained with a one-stop venue showcasing the products of more than 70 members of association. To be in one place competing with producers, who has likely the same raw materials, can showcase various design and position the product’s price competitively demand innovation to other members.

Market dynamics are pronounced in the buying determinants when they resulted to significant difference in terms of price affordability, high in quality, and distinction in design across all products.
from member-industries (refer to Tables 2, 5, 7). These three attributes are prevalent to both leading industries: Fashion and Gifts & Housewares that dominated the top gross sellers among ANP members for the period of 2004-2008 (Tables 11 and 12).

ANP Negros Showroom is continuously facing challenges in face of economic and political shifts directly or indirectly affecting the industry. However, due to its responsive nature to opportunities, may they be out of foresight or marketing hunch, ANP members subsist and guided by the association’s vision-mission statement: advocates of poverty-alleviation through entrepreneurship.

**Recommendations**

ANP has to further Innovation through price affordability, distinctive product designs, and perceived high in quality, through:

1. **Common production facilities among products in an industry;** this more likely lower down production cost and making the product more affordable. This is observed in Cebu furniture manufacturers.

2. **Bulk buying services for common raw materials for indigenous and processed materials;** ANP has to consolidate or collaborate the need of companies to assist in the production. It would make the producers manufacture efficiently due to updated market information from participation in annual product completion and trade fair.

3. **Designs are costly;** hence, ANP showroom producers need the assistance of the association in facilitation Intellectual Property Rights. By observation, product designs become generic overnight due to imitation and transfer of information through internet and other information transmission.

4. **ANP shall launch specific sector trade fair to provide emphasis to specialized product design and be able to position their products to a specific to target market.** Noticeably, in the foregoing presentation of top gross sellers, only one company from Food sector surfaced: Virgie’s Homemade Products.

**References**


Association of Negros Producers. (2008, June 20). **ANP History. ANP Chronicle, I.**


Abstract

The paper reflects the current situation and condition of the waste management in Romania, the identification of the problems and priorities. Waste management in Romania is far from being solved according to the environment rules of the European Union. Students and staff are encouraged to participate in projects or direct studies with some form of global perspective to be better prepared for the future challenges. The analysis of the current situation reflects the condition of the waste management in Romania and it is based on viable statistical data. It leads to the identification of the problems and to prioritize, ensuring sufficient basis for SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats). The SWOT analysis is a synthesis of the current situation in the field of waste management and presents the internal factors on which we have to concentrate (the strengths) or which must be annulled (the weaknesses), as well as favorable external factors (opportunities) or unfavorable (threats).

Keywords: Environmental engineering, waste management, education, entrepreneurship higher education
Background

Waste Management in Romania - SWOT Analysis

Currently, Romania faces acute problems concerning air, water and soil pollution, which requires large investment in the short and the long term and the participation of both the public and the private sector. Essential measures are needed in the fields of waste management, the improvement of water quality, and the enforcement of integrated pollution prevention and control.

It should be also noted that Romania will require massive environmental investment by both the government and industries to comply with EU standards.

In Romania, waste is generated in big amount and this represents one of the biggest and most difficult problems of environment protection. It is one of the highest importance that waste management has to avoid from potential environment risk. Waste management methods and practices produce pollutant emissions that lead to soil and water contamination and subsequently, human health.

Ecologic priorities for Romania are waste management followed by water and air pollution. Waste management in Romania are characterized by: (1) continual growth of waste amount and its respective storage; (2) waste transportation and collection are insufficiency; and (3) insufficient economic benefit of waste development.

There are technical solutions and concepts, which are not possible to develop because of financial constraints. The needed capital for such investments is too expensive for communities.

We do not know the exact amount of waste generated because of lack of measuring equipment. The herein below data represents the volume estimation of generated waste. That is why waste record and management are just partially reflecting the current situation.

According to Regional Plan for Waste Management (RPWM), the amount of household waste for the region is 0.9 kg/person x day for urban area and 0.4 kg/person x day in rural area. The amount of household waste generated in 2007 is approximately 953.000t (Atudorei, 2009).

Rapid industrialization since World War II has caused widespread water and air pollution, particularly in Prahova County, an oil refining region. Romania has 49 cu km of renewable water sources, with about 59% used to support farming and 33% used for industrial purposes. Romania's cities produce on average 3.0 million tons of solid waste per year. Air pollution is heaviest in the nation's cities, where industries produce hazardous levels of sulphur dioxide. In 1992, Romania had the world's 28th highest level of industrial carbon dioxide emissions, which totaled to 122.1 million metric tons, a per capita level of 5.24 metric tons. In 1996, the total dropped to 119 million metric tons.

The analysis of the current situation reflects the condition of the waste management in Romania and it is based on viable statistical data. It leads to the identification of the problems and to prioritizing, ensuring sufficient basis for SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats). The SWOT analysis is a synthesis of the current situation in the field of waste management and presents the internal factors on which we have to concentrate (the strengths) or which must be annulled (the weaknesses), as well as favorable external factors (opportunities) or unfavorable (threats) (Scortar, 2009).

The SWOT analysis confirms the fact that implementing an integrated waste management can have a significant impact on improving the quality of life and environment in Romania. The improvements in the field of waste management in Romania will lead to the promotion of sustainable development.

At the level of Romania, the present research in the field of waste management is concentrated on the strategies, the action plans, the strategic planning of urban systems for waste management.
Discussion

The Challenges Facing Environmental Engineering Education in Romania

Globalization has changed the skills and competencies required from engineers being hired by industry and service providers. Consequently, the responsibility of faculties of engineering in educating and training engineers has changed dramatically. Engineering graduates are now required to have multi-skills, flexibility, managerial competencies and work ethics. Engineering curricula must ensure that graduating engineers can meet the new expectations of industry.

Table 1
SWOT analysis for waste management in Romania

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• National Strategy for Waste Management and establishment of National Plan for Waste Management;</td>
<td>• Big waste quantity which is generated and uncontrolled storage;</td>
</tr>
<tr>
<td>• The elaboration of regional plans for waste management;</td>
<td>• The rate of valorising the useful fractions is reduced;</td>
</tr>
<tr>
<td>• Complexity of the Legal framework for waste management at that moment;</td>
<td>• The reduced quality of soil and water because of pollution with waste which are not stored appropriately;</td>
</tr>
<tr>
<td>• Establishment of guides for waste management systems;</td>
<td>• Precarious infrastructure for collecting, transporting and elimination of waste;</td>
</tr>
<tr>
<td>• More experience by local authorities in developing investment projects financed through European programs;</td>
<td>• Low level of awareness and responsibility of the population and the economic agents concerning adequate waste management;</td>
</tr>
<tr>
<td>• Setting up organizations which are oriented towards promoting efficient and lasting solutions for the waste management process;</td>
<td>• Lack of competent staff for waste management activities;</td>
</tr>
<tr>
<td></td>
<td>• The existence of a big number of historically polluted sites, as a consequence of past economic activities</td>
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<tr>
<td></td>
<td>• Low degree of implementation for the environment legislation;</td>
</tr>
<tr>
<td></td>
<td>• The bureaucracy in obtaining financing for waste management projects;</td>
</tr>
<tr>
<td></td>
<td>• Opportunities</td>
</tr>
<tr>
<td></td>
<td>• Accessing EU funds for improving the environment quality in Romania;</td>
</tr>
<tr>
<td></td>
<td>• Developing waste management system for tourist area;</td>
</tr>
<tr>
<td></td>
<td>• Attracting foreign investors by improving the sanitation services;</td>
</tr>
<tr>
<td></td>
<td>• Developing long-term investment projects in sustainable development conditions;</td>
</tr>
<tr>
<td></td>
<td>• Developing a viable market for recycling waste respectively market for valorizing the products from waste processing;</td>
</tr>
<tr>
<td></td>
<td>• Encouraging “clean technologies”, which are less polluting;</td>
</tr>
<tr>
<td></td>
<td>• Developing partnerships with other city authorities for waste management;</td>
</tr>
<tr>
<td></td>
<td>• Promoting the renewable energy sources;</td>
</tr>
<tr>
<td></td>
<td>• Threats</td>
</tr>
<tr>
<td></td>
<td>• The pressures exercised by domestic waste on the quality of environment factors;</td>
</tr>
<tr>
<td></td>
<td>• Unstable legal framework;</td>
</tr>
<tr>
<td></td>
<td>• A mentality of indifference concerning environmental protection;</td>
</tr>
<tr>
<td></td>
<td>• High cost for implementing “clean technology” and best available techniques for waste management;</td>
</tr>
<tr>
<td></td>
<td>• Irrational exploitation of natural resources;</td>
</tr>
<tr>
<td></td>
<td>• Inappropriate use of EU funds;</td>
</tr>
<tr>
<td></td>
<td>• Delays in approving the waste management projects;</td>
</tr>
<tr>
<td></td>
<td>• Difficulties encountered in financing income-generating projects;</td>
</tr>
<tr>
<td></td>
<td>• Difficulties in choosing the right place for building the waste infrastructure;</td>
</tr>
</tbody>
</table>

Table 1 SWOT analysis for waste management in Romania

Remarks on the development of waste management in Romania:

Strengths:

- National Strategy for Waste Management and establishment of National Plan for Waste Management;
- The elaboration of regional plans for waste management;
- Complexity of the Legal framework for waste management at that moment;
- Establishment of guides for waste management systems;
- More experience by local authorities in developing investment projects financed through European programs;
- Setting up organizations which are oriented towards promoting efficient and lasting solutions for the waste management process;

Weaknesses:

- Big waste quantity which is generated and uncontrolled storage;
- The rate of valorising the useful fractions is reduced;
- The reduced quality of soil and water because of pollution with waste which are not stored appropriately;
- Precarious infrastructure for collecting, transporting and elimination of waste;
- Low level of awareness and responsibility of the population and the economic agents concerning adequate waste management;
- Lack of competent staff for waste management activities;
- The existence of a big number of historically polluted sites, as a consequence of past economic activities;
- Low degree of implementation for the environment legislation;
- The bureaucracy in obtaining financing for waste management projects;

Opportunities:

- Accessing EU funds for improving the environment quality in Romania;
- Developing waste management system for tourist area;
- Attracting foreign investors by improving the sanitation services;
- Developing long-term investment projects in sustainable development conditions;
- Developing a viable market for recycling waste respectively market for valorizing the products from waste processing;
- Encouraging “clean technologies”, which are less polluting;
- Developing partnerships with other city authorities for waste management;
- Promoting the renewable energy sources;

Threats:

- The pressures exercised by domestic waste on the quality of environment factors;
- Unstable legal framework;
- A mentality of indifference concerning environmental protection;
- High cost for implementing “clean technology” and best available techniques for waste management;
- Irrational exploitation of natural resources;
- Inappropriate use of EU funds;
- Delays in approving the waste management projects;
- Difficulties encountered in financing income-generating projects;
- Difficulties in choosing the right place for building the waste infrastructure;
Faculty of Engineering has to redesign and upgrade their curricula to meet the expectation of industry from engineers. The formal education system has to be supplemented with a modular system of education whereby engineers are able to acquire skills and competencies on a continuous basis. These courses should be offered to practicing engineers and should be “on a need basis”, taking into consideration the engineer’s specific requirements for new knowledge and skills (Mardam-Bey, 2008).

Education is an essential tool for achieving sustainability. People now recognize that current economic development trends are not sustainable and that public awareness, education, and training are the key in moving society towards sustainability (McKeown, 2004). Nowadays, environmental issues affect almost all commercial and industrial sectors, and are central concern for the public, governments, and even international relations. There are several Universities in Romania that are offering different programs related to Environmental Science and Engineering (Table 2.). On the other hand, the environmental engineering education program of the most universities of Romania is quite traditional.

Table 2  
Environmental Educational Programmes in Romania

<table>
<thead>
<tr>
<th>No.</th>
<th>Main Universities</th>
<th>Name of Department Schools/ Faculties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“Lucian Blaga” University of Sibiu (LBUS)</td>
<td>Faculty of Engineering - Department of the Science and Technology of Materials - Engineering and Environmental Protection in Industry</td>
</tr>
<tr>
<td>2</td>
<td>University “Politehnica” of Bucharest</td>
<td>The Hydraulics, Hydraulic Machines and Environmental Engineering Department</td>
</tr>
<tr>
<td>3</td>
<td>University “Politehnica” of Bucharest</td>
<td>Faculty of Materials Science and Engineering - Engineering and Environmental Protection in Industry</td>
</tr>
<tr>
<td>4</td>
<td>University of Ecology Bucharest</td>
<td>Faculty of Managerial Engineering – Environmental Engineering</td>
</tr>
<tr>
<td>5</td>
<td>University of Agronomic Science and Veterinary Medicine - Bucharest</td>
<td>Faculty of Landscape Improvement and Environmental Engineering</td>
</tr>
<tr>
<td>6</td>
<td>“Babeș-Bolyai” University, Cluj-Napoca</td>
<td>Faculty of Environmental Sciences</td>
</tr>
<tr>
<td>7</td>
<td>Technical University of Cluj-Napoca</td>
<td>Faculty of Materials Science and Engineering - Department of Environmental Engineering</td>
</tr>
<tr>
<td>8</td>
<td>University “Politehnica” Timișoara</td>
<td>Faculty of Industrial Chemistry and Environmental Engineering</td>
</tr>
<tr>
<td>9</td>
<td>Technical University “Gh.Asachi” Iasi</td>
<td>Faculty of Hydromechanics, Geodesy and Environmental Engineering</td>
</tr>
<tr>
<td>10</td>
<td>Transylvania University of Brasov</td>
<td>Faculty of Science and Engineering of Materials - Engineering and Environmental Protection in Industry; Engineering of Waste Valorification</td>
</tr>
<tr>
<td>11</td>
<td>The University “Dunarea de Jos” Galati</td>
<td>Faculty of Mechanics and Environmental Engineering</td>
</tr>
<tr>
<td>12</td>
<td>University of North Baia Mare</td>
<td>Faculty of Mineral Resources and Environment</td>
</tr>
<tr>
<td>13</td>
<td>University of Oradea</td>
<td>Faculty of Environmental Engineering</td>
</tr>
<tr>
<td>14</td>
<td>“Constantin Brancusi” University of Targu Jiu</td>
<td>Faculty of Engineering - Engineering and Environmental Protection in Industry</td>
</tr>
<tr>
<td>15</td>
<td>“Aurel Vlaicu” University of Arad</td>
<td>Faculty of Food Engineering, Tourism and Environmental Protection</td>
</tr>
<tr>
<td>16</td>
<td>University of Craiova</td>
<td>Faculty of Engineering and Technological Management - Industrial Environmental Protection</td>
</tr>
<tr>
<td>17</td>
<td>University Valahia Targoviste</td>
<td>Faculty of Environmental Engineering and Biology</td>
</tr>
<tr>
<td>18</td>
<td>University of Petrosani</td>
<td>Faculty of Mining Engineering</td>
</tr>
<tr>
<td>19</td>
<td>“Sapientia” University of Miercurea Ciuc</td>
<td>Faculty of Sciences - Engineering and Environmental Protection in Industry</td>
</tr>
</tbody>
</table>
Students should be made aware of the issues and ideas concerning the environment and the impact of new developments on it as early as possible in their education, with the objective of raising their interest and appreciation for the environment and its protection. Through industrial visits and practical terms spent in industry, students should be encouraged to make themselves familiar with new approaches to sustain development and environmental protection undertaken by industrial organizations. Industry recognizes its responsibility for the environment and is keen to be involved in environmental education and training (Bolcu, 2009). Most faculties lack a clear vision regarding strategies needed to inform their students about the future needs of industry. Thus, there is an urgent need for an important change in perspective and in the model used for establishing new curricula.

Romanian research in the waste field is making progress gradually having the role to support and fundament the actions of the local and central authorities in order to adopt and put into practice those waste management systems which are similar to the most spread European practices. Thus, at the level of central authorities, there are two national research institutes subordinated to the Ministry of Environment (The National Institute of Research and Development for Environment Protection – ICIM Bucharest and The National Institute of Research and Development for Industrial Ecology – ECOIND) which include laboratories and special sections for research in the field of technologies for waste management.

The role of these research institutes is to fundament scientifically, based on national statistics and national reference databases, the government and local adopted strategies, as well as to monitor the implementation of the engagements taken when the treaty for joining the European Union was signed (through the corresponding monitoring plans).

It is required more emphasis on education and an awareness of the issue, but including such programs at the school level requires substantial efforts. It is believed by community motivators that any form of curricular education is more effective than mass awareness raising campaigns. Introducing a new course at the school level, it’s a must for Romania, so far there is no such program and only a few universities are offering education in the field of Environmental Engineering.

Waste management is a difficult and complex problem in Romania which is far from being solved according to the environment rules of the European Union. The worsening of the waste problem, especially of the domestic waste is generated by the significant increase of its quantity, as well as by the inappropriate way of solving different stages of waste processing.

**Entrepreneurship Environmental Engineering of Education at LBUS**

Education and awareness in the area of waste and waste management are increasingly important from a global perspective. A suitable level of ecological awareness among wide circles of society and carrying out scientific research are both necessary to achieve the state when making the right decisions regarding protection of the environment and proper management of environmental resources. Figure 2 schematically presents basic interactions between the three spheres of human environmental activities. Ecological education may be accomplished at two levels (Namiesnik, 2009): general ecological education, whose goal is raising awareness and general knowledge about the environment at all levels of education (from elementary school up to university), training future specialists in particular, environment related branches of science and technology.

The development and reform of school curricula are an ongoing preoccupation for educational authorities in all countries. Students are expected to become familiar with the theories and (recent) developments in the multidisciplinary fields of environment research. In addition, a student has to know which quantitative and qualitative research methods are available and when or how to apply them. Students should be able to position their research (project proposal and final dissertation) in a theoretical and methodological context of current international scientific development.
Addressing environmental problems requires ingenuity. Entrepreneurship places emphasis upon the range of skills and understanding needed in order to make something of value actually happen - whether this is establishing a new enterprise, transforming an existing business or ensuring someone achieves positions of leadership in a corporate setting. Environmental entrepreneurship can take place through new product design, new technologies, and new organizational arrangements. For example, each semester, 2 students travel to Germany for theoretical and technological knowledge and skills. Students are expected to become familiar with the theories and recent developments in the multidisciplinary fields of environment research. In addition, students have to know which quantitative and qualitative research methods are available and when or how to apply them. At the end of that staff exchange courses, students gain valuable information related to environmental protection and life cycles of the products. Also, the ways in which environmental impact can be reduced. This role is likely to become more significant in the future. Students should be able to position their research project proposal and final dissertation in a theoretical and methodological context of Global Environmental Problems.

Another important activity that we can give as an example from “Lucian Blaga” University of Sibiu is the implication of students into research projects, financed by European Union. Students can learn how to develop and apply for research project in the field of Environmental Engineering, to define problems and to search the right solution for solving them. Twenty students from different study years are involved in two such projects together with Environment Protection Agency Sibiu, and Stavanger Rathouse, Norway. During this project they travel to Norway for experience-exchange, attending meetings and learning from our colleagues on how to manage environmental problems from engineering’s point of view. As a result, we may exemplify a student project for green roofs in Sibiu that
starts this year. Students gain the ability to have an international perspective on social, cultural and global responsibilities.

University aims to create a whole new generation of environmental entrepreneurs with the skills that will allow them to launch new ventures, products, and technologies that address society's environmental and natural resource problems. To develop management, consultancy, engineering and technology professionals who would like to refocus their career on environmental entrepreneurship.

**Conclusion**

Environmental Engineering education in Romania is at the beginning and there are a lot of obstacles for promoting these fields of study. The main obstacles are summarized as: (1) the budget limitation for establishment of environmental engineering programs; (2) lack of academic staff in different new field of environmental engineering; and (3) lack of professional jobs for environmental engineering graduates.

Clearly, up to now the environmental problems facing Romania have not been addressed. The main obstacle in implementing environmental projects is still the lack of financial support. The low amount of environment investments is primarily due to a lack of environmental financing instruments.

**References**


The Role of National Innovation Systems in a Knowledge-Based Economy: A Systemic Approach

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Abstract

This paper aims at presenting an overview of the concept of National Innovation Systems (NIS), their history and role in the understanding of a systemic approach of research, development and innovation at both national and global level. In March 2000, European Council gathered in Lisbon and set out the “Lisbon Strategy” an action and development plan aimed at turning the European Union (EU) into the most competitive economy in the world and achieving full employment by 2010. This strategy, developed at subsequent meetings of the European Council is based on three pillars: (1) Economic Pillar; (2) Social Pillar; and (3) Environmental Pillar. Decisions involving research and innovation are paramount to all stakeholders (decision makers, industry, academia, interest groups, and others). They transcend the individual or company level at which research and innovation primarily occur, having multiplied effects at local, regional, national and international scale. In our paper we will present a brief introduction to the main operational concepts and the history of the NIS. We will also include an analysis of the current situation of research and innovation in Romania.

Keywords: National Innovation Systems (NIS), knowledge-based economy, systemic approach, Romania
Background

It has become a widely acknowledged fact that modern economies are now being referred to as knowledge-based, due to the ever increasing relevance that knowledge is acquiring in everyday life. It is also true that institutions, companies and individuals progressively rely on knowledge as a key component for individual and collective growth.

However, knowledge in this context will be referred to as the one used by companies in the production process and, more importantly, in innovative activities. A company’s ability to innovate is mostly dependent on its ability to actually seize and foster human intellectual capital in an effective and efficient manner. This process is based on research and development (R&D), which represents a paramount activity for generating new knowledge for production and innovation. Nevertheless, the simultaneous ongoing processes of knowledge deepening and widening – which leads to a general expansion of the range of available technologies, as well as to a growing specialization of competencies – requires new, interactive patterns of learning.

Individual learning activities – as they are conceived in an R&D laboratory – are no longer sufficient to bring together all the necessary knowledge it takes to be competitive. Innovative firms require specialized knowledge, along with more types of knowledge, which increasingly are to be found outside the firm itself. Notwithstanding, because of its tacit component, knowledge, and particularly new knowledge, can be difficult to acquire in the market, so that companies turn to some form of collaboration with other companies and/or institutions that possess the required knowledge and, on a reciprocal basis, are ready to share it. Consequently, companies aim at creating links through which to access disparate and specialized resources of knowledge needed to innovate. The nascent configuration and reconfiguration of social networks of all types will by necessity reflect the shifting demand of the knowledge economy.

As a result of the increasing competitive pressure from emerging economies, modern manufacturing industries in developed countries have progressively shifted their focus from the physical processes of production to the design and marketing phases and, more importantly, to the innovation of new products and production processes. Actually, in a globalized and competitive environment, the only worthwhile method for companies operating in rich countries to increase competitiveness is to permanently empower their innovative capabilities.

According to Nelson and Rosenberg (1993), innovation represents the process by which companies master and put into practice new product designs and manufacturing processes; at the same time it is a process in which 'new knowledge or new combinations of old knowledge are embodied in products and production processes and possibly introduced into the economy (Oerlemans et al., 1998, p. 4). Therefore, innovation essentially entails the use of existing knowledge, as well as the ability to generate and acquire new knowledge (Howells, 2002, p. 872).

In order to address the need for concerted efforts towards fostering innovation and developing a coherent research strategy at national and international level, the European Council gathered in Lisbon in March 2000 and set out the “Lisbon Strategy” - an action and development plan that had as aim to turn the European Union (EU) into the most competitive economy in the world and achieving full employment by 2010. This strategy, developed at subsequent meetings of the European Council, is based on three pillars:

- An economic pillar preparing the ground for the transition to a competitive, dynamic, knowledge-based economy. In this context, great importance is laid on the need to constantly adapt to changes in the information society and to encourage research and development.
- A social pillar designed to modernise the European social model by investing in human resources and combating social exclusion. To this end, the Member States have to invest in education and training, and to carry out an active policy for employment, thus facilitating the move to a knowledge economy.
• An environmental pillar, which was subsequently added at the Gothenburg European Council meeting in June 2001, draws attention to the fact that economic growth must be dissociated from the use of natural resources (Europa, n.d.).

As a follow-up, a list of targets has been drawn up with a view to attaining the goals set in 2000. Considering that the above-mentioned actions fall almost exclusively within the sphere of competence of the Member States, an open method of coordination (OMC) necessitating the development of national action plans has been introduced. In the Conclusions of the Presidency, it was said that the European Union set as new strategic goal “to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion. Achieving this goal requires an overall strategy aimed at: (1) preparing the transition to a knowledge-based economy and society by better policies for the information society and R&D, as well as by stepping up the process of structural reform for competitiveness and innovation and by completing the internal market; (2) modernising the European social model, investing in people and combating social exclusion; and (3) sustaining the healthy economic outlook and favourable growth prospects by applying an appropriate macro-economic policy mix’’ (European Council, 2000).

As far as the strategy is concerned, it was stated that it was created to “enable the Union to regain the conditions for full employment, and to strengthen regional cohesion in the European Union.” The European Council saw the need “to set a goal for full employment in Europe in an emerging new society which is more adapted to the personal choices of women and men. If the measures set out below are implemented against a sound macro-economic background, an average economic growth rate of around 3% should be a realistic prospect for the coming years.” The means through which the strategy could be implemented were also taken into consideration – and here was the role of the OMC emphasised: “improving the existing processes, introducing a new open method of coordination at all levels, accompanied by a stronger guiding and coordinating role for the European Council to ensure more coherent strategic direction and effective monitoring of progress.”

This method entails establishing specific guidelines and timetables to attain the short, medium and long term goals set by the Member States; quantitative and qualitative indicators and benchmarks to compare with ‘the best in the world’ and adjusted to the needs of various Member States and sectors in order to assimilate best practice; converting these guidelines into policies, with achievable targets and measures, allowing for national and regional differences; and last but not least, carrying out regular monitoring, evaluation and peer review meant as interactive and participatory learning processes.

Acting upon these recommendations, the European Research Ministers in their Council Resolution adopted on 15 June 2000, asked the Commission, in cooperation with the Member States, to produce a full set of indicators and a methodology for benchmarking the following themes: (1) Human resources in Research, Technology and Development (RTD), including attractiveness of science and technology professions; (2) Public and private investment in RTD; (3) Scientific and technological productivity; (4) Impact of RTD on economic competitiveness and employment; and (5) Public understanding of science and technology.

This represented in fact the first time that a benchmarking exercise in the area of RTD policies had been launched at EU level.

Research Question

Is a systemic approach to national innovation systems appropriate for the understanding of research and innovation processes in a knowledge-based economy?
Research Objectives

1. to review the concept of National Innovation Systems (NIS);
2. to analyse the role of NIS from a systemic approach perspective;
3. to analyse research and innovation within the Romanian context;
4. to provide suggestions and recommendations for the successful implementation of a coherent and appropriate research and innovation strategy at national level.

Theoretical Framework

According to the Frascati Manual. *Proposed standard practice for surveys on research and experimental development* (2002), Paris: OECD (p. 30), R&D represents “creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications”. It comprises three broad activities: (1) basic research (experimental or theoretical work carried out in order to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use); (2) applied research (original investigation performed with a view to acquiring new knowledge, but unlike basic research, it has a specific practical aim or objective); and (3) experimental research (systematic work, using existing knowledge obtained from research and/or practical experience, which is aimed at producing new materials, products or devices, to installing new processes, systems and services, or to improving those already produced or in use). R&D encompasses both formal R&D in R&D units and informal or occasional R&D in other units.

According to The Oslo Manual. *Guidelines for Collecting and Interpreting Innovation data* (2002, p. 46), innovation represents the “implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations” (OECD, 2005). The same document lists four types of innovation: (1) product innovation (the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses, including relevant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics); (2) process innovation is the implementation of a new or greatly improved production or delivery method, including important changes in techniques, equipment and/or software); (3) marketing innovation (the implementation of a new marketing method encompassing important changes in product design or packaging, product placement, product promotion or pricing); and (4) organisational innovation (the implementation of a new organisational method in the company’s business practices, workplace organisation or external relations).

Traditionally, the analysis of innovative and economic performance is focused on the ‘inputs’ (e.g. research expenditures) and the ‘outputs’ (e.g. patents). Over time, the limitations of these traditional methods had become evident and “their ability of measuring general innovativeness of an economy is small” (OECD, 1997, p. 9). This approach lacks an explanation that justifies the trends in innovation, growth and productivity and neglects to analyse how the actors interact in the innovation process.

It is important in the following to explain concept of ‘national innovation systems’ (NIS), by which we broadly understand a network of stakeholders who have a vested interest in creating, developing and promoting science and technology outputs. The interactions among the various stakeholders involved are of key importance in translating these ‘inputs’ and ‘outputs’ and the study of this web of interactions is a direct concern of NIS.

There is not a single, widely-accepted definition for NIS. The following are some common definitions (OECD, 1997, p. 10) of the above concept:

“... the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies” (Freeman, 1987).
“... the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge ... and are either located within or rooted inside the borders of a nation state” (Lundvall, 1992).

“... a set of institutions whose interactions determine the innovative performance ... of national firms” (Nelson, 1993).

“... the national institutions, their incentive structures and their competencies, that determine the rate and direction of technological learning (or the volume and composition of change generating activities) in a country” (Patel & Pavitt, 1994).

“... that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies” (Metcalfe, 1995).

A brief history of the NIS notion is provided by professor Bengt-Åke Lundvall, in a working paper (Lundvall, 2007) produced by Swedish Institute for Growth Policy Studies (ITPS) in 2007. Lundvall posits that the ideas encompassed by this concept were first to be found in the works of Friedrich List (1841), whose interpretation of ‘national systems of production’ paid heed to a wide set of national institutions including those operating in education and training as well as infrastructures such as networks for transportation of people and commodities. He put more emphasis on the development of productive forces rather than on allocation issues. From his position of a German catch-up economist he was disapproving of the ‘cosmopolitan’ approach of Adam Smith (1776), where free trade was assumed to be the appanage of both Germany (the laggard) and England (the lead economy).

As far as the ‘national production system’ was concerned, List called attention to the necessity for the state to build national infrastructure and institutions with a view to promoting the accumulation of ‘mental capital’ and use it to stimulate economic development rather than just to sit back and rely on ‘the invisible hand’ to manage all problems.

The next to address the issue of the ‘national system of innovation’ was Christopher Freeman in a paper he wrote in 1982 (but only published in 2004) for the Organisation for Economic Co-operation and Development (OECD) expert group on Science, Technology and Competitiveness, with the title “Technological infrastructure and international competitiveness”. Freeman (2004) too stressed the usefulness of government involvement in promoting the development of a technological infrastructure. He also underlined the limited relevance of short-term competitiveness strategies such as manipulating national wage and currency rates. One of the tenets of Freeman’s theory is that, if we want to understand why and how world economic supremacy moves from one country to another, we need to look at how new technological systems come to the fore and how they fit in or clash with the existing national patterns of institutions. It may well be possible that some countries, prospering in the context of one technological system may fall prey to their own success since they will have great difficulties in adapting their institutional apparatus to the new technological system.

Starting with the ‘80’s, the necessity of a national system of innovations began to gain ground among several economists concerned with innovation research. Dick Nelson and other American scholars had compared technology policy and institutions in the high technology field in the US with similar patterns in Japan and Europe. The Science and Technology Policy Research at Sussex University carried out several studies comparing industrial development in Germany and the UK examining for instance differences in the management of innovation, work practices and engineering education.

The modern version of the full concept ‘national innovation system’ came to life in specialist literature in 1987, in Christopher Freeman’s book on innovation in Japan. In his work he made a thorough analysis of both ‘intra’ and ‘inter’ organizational characteristics of firms, corporate governance, the education system as well as the role of government (Freeman, 1987). Freeman’s cooperation with Nelson and Lundvall on a major International Federation of Institutes for Advanced Study project on technical
change and economic theory resulted in a book with a section with chapters on ‘national systems of innovation’.

Another contribution that is worth mentioning in this context is the one made by Michael Porter (1990) on the competitive advantage of nations. Although there is no explicit reference to the concept of innovation system as such, there is nevertheless, significant interrelation with the ideas propounded in the above-mentioned works. His emphasis on feedback mechanisms from and interaction with domestic suppliers and users as a factor that gives competitive advantage is especially noteworthy.

As far as different approaches to delineate the constituent elements of an innovation system, we need to emphasise the fact that different scholars have different conceptions. The presentation of various definitions, as made by Lundvall in the above-mentioned paper, might nonetheless prove useful for the purpose of our study.

Lundvall (2007, p. 12) contends that one of the main common underlying premises is that national systems differ in terms of specialization in production, trade and knowledge. This is in fact not a new idea, since neoclassical trade theory starts from a similar assumption. Still, the difference lies in that among NIS-analysts it is assumed that there exists a dynamic co-evolution between what countries specialize in doing and what people and firms in these countries know how to do well. The implications are that, on the one hand, both the production structure and the knowledge structure will change only slowly and, on the other, that such change must involve learning. The fact that the trade specialisation does not imply a comparative advantage engenders a debate on what kind of specialisation might be most favourable to generate economic prosperity.

Secondly, Lundvall (2007, p. 12) maintains that elements of knowledge that bear relevance to economic performance tend to be localized and therefore cannot be easily transferred from one place/context to another. NIS are necessary exactly because we live in a society where knowledge does not equal information, and people do not all have unlimited access to information.

Thirdly, as a follow-up to the previous assumption, he upholds that knowledge, which represents something more than information, encompasses tacit elements as well. It may be contended that significant elements of knowledge are intertwined in the minds and bodies of agents or anchored in routines of companies and not least in relationships between people and organizations. This hypothesis is construed along the line of a similar contention that innovation system approaches transcend the precept of methodological individualism (Lundvall, 2007, p. 13).

Fourthly, if we are to grasp the process of innovation, we have to concentrate on interaction and relationships, as companies, knowledge institutions and individuals very rarely innovate on their own, innovation being in fact a corollary of the multiplying processes of interactive learning and searching. Therefore, this entails that the system needs to be addressed concurrently from both the point of view of its constituent elements and that of the relationships established between the afore-mentioned elements. Consequently, it can safely be predicated that the innovation system approach is entirely ‘interactionist’ (Lundvall, 2007, p. 13).

NIS have captured increased analytical consensus because they recognise the importance of knowledge flows.; there is a increased usage of systems approaches and the knowledge institutions are greater than ever in number. The knowledge embodied in human beings, known as ‘human capital’ or ‘tacit knowledge’ is also being recognised as of key importance to economic growth. The remaining ‘codified knowledge’ resides in publications, patents and an increasing number of sources cultivated by the information technology diffusion. Innovation is considered as the result of the complex interaction between various stakeholders, including those within the system’s feedback loops.

An understanding of NIS helps identify leverage points and pinpoint mismatches that Government policies need to address so as to boost the overall innovation performance and competitiveness of a nation. The measurement and assessment of core knowledge flows is centred on:
1. Industry Interactions e.g. joint research activities and technical collaborations, such as the Co-operative Agreements and Technology Indicators database of the Maastricht Economic Research Institute on Innovation and Technology.

2. Public/Private Interactions among enterprises, academia and research institutes e.g. co-research, co-patenting, co-publications, citation analysis, exchange programs and firm surveys.

3. Knowledge Distribution Power of and technology e.g. technology, use of advanced machinery and equipment adoption rates.

4. Personnel mobility e.g. movements of skilled personnel to and fro various enterprises and institutions (OECD, 199, p. 7-18).

Countries tend to evolve along technological paths, know as ‘trajectories’, dependent of past, present and future patterns of knowledge accumulation that usually are country specific. Generally speaking some countries are not in a position to diffuse technology across a whole range of industries, but “in clusters of industries connected through vertical and horizontal relationships” (Porter, 1990). Different clusters have varying knowledge patterns dependent of the country specific context. A densely knitted knowledge network amongst forestry firms in Finland gave this specific cluster a strong national economic position and a competitive edge internationally.

“The quality of public research infrastructure and its links to industry may be one of the most important national assets for supporting innovation. Government supported research institutes are main performers of generic research and produce not only a body of basic knowledge for industry, but are also sources of new methods, instrumentation and valuable skills” (OECD, 1997, p. 9). The firms that have access to outside knowledge, by linking to knowledge networks and which are capable of adapting this knowledge to their needs are considered as the most innovative firms. Some Nordic studies (Smith et al, 1995; Stenberg et al, 1996) have proved that higher levels of qualified personnel mobility contributed positively to both the overall labour force skills level and to the economic innovative performance. Other NIS studies, in countries like Germany, have shown that technical collaboration, technology diffusion and personnel mobility have improved the innovative capacity in most sectors.

There are different ways of analysing NIS (OECD, 1997, p. 7-8, 21):

1. Firm-level innovation surveys that question and rank innovation sources e.g. the Community Innovation Survey (CIS) and Policies, Appropriability and Competitiveness for European Enterprises Project.

2. Cluster analysis e.g. sectoral analysis.

3. Differing levels e.g. international, pan-regional, national and sub-regional.

The national level continues to be the most important, due to nation-specific, domestic interactions but at the same time the importance of a more open NIS concept is being acknowledged. International knowledge indicators are relatively advanced and in general increasing in most countries although with varying levels and pace. The United States and Europe remain the largest net exporter and the largest net importer of “know-how” (OECD, 1997, p. 29). The importance of R&I has gained ground at all levels of the economy and governments have directed their intervention on domestic market failures through R&I tax credits and subsidies (OECD, 1997, p. 41). These instruments need to be complemented with new policies targeted at increasing the networking and absorptive capacities of domestic firms. Firms need to invest internnally in R&I, personnel training and ICT to identify sector specific innovations and technologies that can be blended or adapted according to the firms’ needs. Statistical indicators that are capable of measuring knowledge distributions and interactions between stakeholders are still not as robust as conventional indicators mainly due to a lack of specific datasets. The ultimate goal is to establish a link between NIS and economic performance in a way that countries can be made comparable across different sectors (OECD, 1997, p. 41-46).
Methodology

In order to analyse the National Innovation Systems (NIS), the key elements involved (Social and Human Capital, Research Capacity, Technology and Innovation Performance, and Absorptive Capacity) and the relations between them, as well as to adopt a systemic approach to NIS in order to understand the mechanisms of a knowledge-based economy, extensive field work was conducted with objective of assessing government strategies and policies targeting key elements of the NIS.

During the research phase the authors reviewed existing information related to STI issues at the national level (laws, regulations, reports, etc.), as well documents elaborated by international organisations (OECD, EUROSTAT, CEC, etc.).

Results and Discussion

According to the Annual Innovation Policy Trends and Appraisal Report: ROMANIA, 2006 (part of the European Trend Chart on Innovation), the situation of our country, though not satisfactory, does not look too gloomy. “Romania is currently in the sixth year of continuous economic growth, with annual growth rates of about 5% since 2001, and is working towards a gradual reduction of the development gap to EU member states. Economic growth is mainly the result of technology upgrading through imports and foreign direct investment flows, industrial downsizing and restructuring, combined with a disciplined fiscal policy and a tight monetary policy that led to improvements in the business environment and the functionality of the Romanian market.” Among the key macroeconomic indicators that are indicative of this positive economic performance, the authors mention:

- A real GDP growth of 4.1% recorded in 2005 compared to 2004, which was, on the one hand, boosted by increasing internal demand, cuts in private and corporate income taxes since the introduction of the 16% flat rate tax in 2004, and, on the other hand, tempered by the negative effect of the net export and the high dependency of the economy on imports of energy and raw materials. The 2005 value of the GDP per capita remains, however, very low – about a third of the EU average.

- Labour productivity per person employed grew by 3.3% in the first semester of 2005 against the same period of 2004, and by 8.9% in the first quarter of 2006 against the same period of 2005, due to industry downsizing and increasing industrial production. The 2005 values of labour productivity remain however very low, accounting for about a third of the EU average.

- Inflation rate recorded a strong decline since 2000, reaching 9.1% in 2005, but is still one of the highest among EU members and candidate countries. With an average monthly inflation rate of 0.7% in the period from January to November 2005, the estimated inflation target of 7.5% for 2005 was not met due to complex internal and external factors.

- Unit labour costs are low in Romania and are currently the country’s main competitive advantage. However, this advantage is expected to fade out after Romania’s accession to the EU, which calls for firm action to encourage in-house R&D and innovation, to help decrease the imports of technology and equipment and increase the value-added of Romanian products on the internal and external markets. In addition, the competitive advantage of low labour is likely to be overshadowed by the danger of a lock-in in labour-intensive or natural-resource-intensive and low skill patterns of specialisation. Therefore, the move to higher technology and competitive activities needs considerable adjustments of the labour market, investment in education and upgrading of workforce skills, as well as larger FDI (foreign direct investments) flows for technology investments.

- The FDI volume in 2005 grew by 58% compared to 2004 levels, as a result of improvements in the business environment and effects of the flat rate tax, and the ascending trend continued in 2006. FDI flows are predominantly oriented towards industry, due to some advantages Romania has compared to its neighbouring countries, such as lower real estate prices, cheap and qualified workforce, the existing production capacities and tradition in some industrial fields.
In Romania, the Lisbon Strategy objectives are pursued in the light of national priorities. A first document titled “Romania’s contribution to the intermediate evaluation of Lisbon Strategy” was published in March 2005. It was also formally presented to the European Commission. The document was prepared by two independent organisations: the Romanian Centre for Economic Policies and the Applied Economy Group. It is based on an initiative (and support) of the Ministry of Foreign Affairs. The exercise was repeated in October 2005, with funding provided by the UK Embassy in Bucharest. In September 2005 the government appointed the Romanian representative to the High Level Group for National Reform Programmes – a state secretary in the Ministry of European Integration. In October 2005, the Working Group for the Elaboration of the National Reform Programme (NRP) was set up and reunited representatives of all institutions concerned.

The working group relies on the main strategy documents elaborated by the Romanian government:

- The Pre-accession Economic Programme and the 2007-2013 National Development Plan
- The Industrial Policy of Romania
- The National Strategy for Regional development – Regional Operational Programme
- Several 2007-2013 Sectoral Operational Programmes: Transport Infrastructure, Human resources Development, Increasing Economic Competitiveness;
- The 2004-2008 Government Strategy for the development of SMEs;
- The 2006-2008 National Plan for poverty alleviation and promotion of social inclusion
- The 2004-2005 National Programme for the labour market
- Romania’s position documents.

The Working Group has defined the main structural elements of the Romanian National Reform Programme (NRP) according to the integrated guidelines and the 14 structural indicators, taking into account the NRPs prepared by the Member States and the Commission feedback on these documents. The NRP preparation stage ended in February 2006 and the ministries concerned forwarded all documents needed for the final form of the NRP to the Ministry of European Integration. The first version of the Romanian NRP was the subject of a public consultation from June to September 2006. The final version was to be approved by the parliament in October 2006, thus respecting Romania’s political commitments deriving from the Lisbon Strategy. In its current form, the Romanian NRP defines the medium-term priorities of the country as economic stability and sustainability of public finance, increasing economic competitiveness and productivity and improving the labour market. The key factor in pursuing these priorities is the development of appropriate infrastructures, both human and material. Based on the above medium-term priorities, the Romanian NRP defines 14 key priorities, structured on three categories according to the Integrated Guidelines:

**Macro-economic priorities: economic stability and sustainability of public finance**

1. Macroeconomic stability (guidelines 1, 4);
2. Reform of the social security and health insurance systems (guideline 2);
3. Control of public expenditure (guidelines 1, 3, 4);
4. Increasing the quality of public services and the administrative efficiency (guidelines 3, 5);
5. Ensuring a balanced energy system (guidelines 1, 4, 16);

**Micro-economic priorities: improving economic competitiveness and productivity**

6. Knowledge and Innovation (guidelines 7, 8, 9);
7. Promotion of entrepreneurship (guidelines 7, 15, 10);
8. Information and communication technologies (guideline 9);
9. Development of transport networks (guidelines 8, 11);
10. Increasing regulation quality (guidelines 12, 13, 14, 15);
11. Sustainable management of renewable and non-renewable resources. Energy efficiency (guidelines 8, 11)

Labour market priorities: quality of labour market for all age groups
12. Labour market flexibility and security (guidelines 17, 18, 21, 22);
13. Improving access to labour market (guidelines 19, 24);

The theme of ‘Knowledge and Innovation’ is included in the micro-economic priorities for improving economic competitiveness and productivity. The key priority in this area is to increase the public funding for RDI to 1% of GDP until 2010, and to 3% of GDP in total (two thirds of which would be financed by the private sector) around 2015. Other priorities for RDI include:

• **Strengthening human resources for RDI** by promoting changes in the higher education system to provide better support to scientific careers, increasing the number of PhDs and senior researchers, increasing the mobility of researchers and the investments in modern research equipment, enhancing business-university interaction. These objectives are specifically addressed by some policy measures like the ‘Research of Excellence’ Programme (RO_28), TransIno Programme for technology transfer and innovation through public-private partnerships (RO_23), "Partners for Excellence" Programme (RO_38) and UNIversities for SOciety (UNISO) Programme (RO_39).

• **Promotion of Knowledge** – in this respect, the NRP envisages the creation in 2006 of a National Council for Research and Development that will approve the strategic RDI priorities. The priority areas of the forthcoming 2007-2013 National RDI Plan are: information technologies, competitiveness through innovation (advanced technologies in industry, agriculture, health, energy, transports), sustainable development (including eco-technologies), and quality of life. In order to improve the resource allocation, the national system for the evaluation and accreditation of RDI institutions and personnel was consolidated. In addition, Romania will continue to support international cooperation and internationalisation of research through different financial instruments, such as the CORINT Programme for International Co-operation and International Partnership (RO_8).

• **Promotion of Innovation** – the main objectives are: strengthening innovation infrastructure, increasing the efficiency of university-industry cooperation and facilitating technology transfer to economic agents. Consolidation of innovation infrastructure is currently supported by the INFRA TECH Programme (RO_22), while public-private partnerships are supported by the ‘Research of excellence’ programme (RO-28) and 18 national technological platforms monitored by MER-NASR (Ministry of Education and Research-National Agency for Scientific Research), which bring together R&D institutions, universities and private firms. In addition, the new RDI Plan for the period 2007-2013 will provide support to industrial clusters, with direct benefits to innovative SMEs and start-ups. Other priorities directly targeting innovative SMEs and start-ups are the creation of a risk capital fund, state aid schemes and better access to public procurement, but they are not yet met by any of the existing policy measures.

• **Protection of intellectual property rights (IPR)** – in this respect, the NRP encourages the application of measures included in the Action Plan for the Implementation of the National Strategy in the field of IPR. These measures include the creation of regional structures to inform and provide consultancy services to SMEs on their IPRs, a better interaction of SMEs with excellence centres and innovation poles in order to ensure effective technology transfer to SMEs, modernising IPR legislation and procedures, the promotion of industrial policy advisers, the simplification of patent application procedures, increasing the technological component of FDIs, etc. These objectives are only partially addressed by the existing policy measures, such as the INFRAS Programme for the consolidation of standardisation and quality infrastructures (RO_7) and CALIST Programme for Quality and Standardisation (RO_6).
We will present below the situation of our country as compared to other European countries, in terms of innovation, by five dimensions: **Innovation drivers** (which measure the structural conditions required for innovation potential), **Knowledge creation** measures the investments in R&D activities), **Innovation & entrepreneurship** (which measures the efforts towards innovation at the firm level), **Applications** (which measures the performance expressed in terms of labour and business activities and their value added in innovative sectors), and **Intellectual property** (which measures the achieved results in terms of successful know-how). Based on the Summary Innovation Index (SII), The European Innovation Scoreboard 2007 established the following classification of European countries:

- Sweden, Switzerland, Finland, Israel, Denmark, Japan, Germany, the UK and the US are the **innovation leaders**, with SII scores well above that of the EU27 and most other countries. Sweden has the highest SII of all countries, but its leading position is mostly based on strong inputs.
- Luxembourg, Iceland, Ireland, Austria, the Netherlands, France, Belgium and Canada are the **innovation followers**, with SII scores below those of the innovation leaders but equal to or above that of the EU27.
- Estonia, Australia, Norway, Czech Republic, Slovenia, Italy, Cyprus and Spain are the **moderate innovators** with SII scores below that of the EU27.
- Malta, Lithuania, Hungary, Greece, Portugal, Slovakia, Poland, Croatia, Bulgaria, Latvia and Romania are the **catching-up countries**. Although their SII scores are significantly below the EU average, these scores are increasing towards the EU average over time with the exception of Croatia and Greece. Turkey is currently performing below the other countries included in the EIS (European Innovation Scoreboard).

As can be seen from the above figure, Romania is the worst performer, with the lowest score, out of all the catching-up countries, i.e. 0.18, followed by Latvia and Bulgaria. As for the catching-up countries, mention should be made of the fact that, although below EU average in all of the dimensions there are some noteworthy exceptions, such as on Applications where Malta has the highest ranking and where Slovakia ranks above some innovation leaders. In both cases these countries rank highly on sales of
new to market products, which may be a reflection of the relatively small markets that companies in these countries operate within. In both cases the high score on Applications is also partly due to the structure of their economies, as Malta has high exports of high technology products and Slovakia a high share of employment in medium-high and high tech manufacturing. Although Turkey’s overall performance is below that of EU Member States, it has a stronger performance than some Member States on Knowledge creation.

**Figure 2. Innovation drivers**

![Innovation drivers](source)

**Figure 3. Knowledge creation**

![Knowledge creation](source)

**Figure 4. Innovation and entrepreneurship**

![Innovation and entrepreneurship](source)
According to EUROSTAT, *Key figures on Europe*, the 2009 edition, the gross expenditure on R&D in 2006 in Romania was 0.45, against the 3% target of the Lisbon strategy. Gross domestic expenditure on R&D (often referred to as GERD) is composed of four separate sectors of performance: business enterprises, government, higher education, and private non-profit organisations. Expenditure data consider the research expenditure on the national territory, regardless of the source of funds; data are usually expressed in relation to GDP, otherwise known as R&D intensity (EC OECD, 2008, p. 191).
Table 1

Gross domestic expenditure on R&D (GERD), 2006

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<th>Share of GDP (%) (1)</th>
<th>Breakdown by source of funds (% of GERD) (2)</th>
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<tr>
<td></td>
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<td>Business enterprise</td>
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<tr>
<td>EU-27</td>
<td>1.84</td>
<td>54.6</td>
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<tr>
<td>Euro area</td>
<td>1.86</td>
<td>56.7</td>
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<tr>
<td>IT</td>
<td>1.09</td>
<td>39.7</td>
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<tr>
<td>CY</td>
<td>0.42</td>
<td>16.8</td>
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<tr>
<td>LV</td>
<td>0.70</td>
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<td>LT</td>
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<tr>
<td>LU</td>
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<tr>
<td>SI</td>
<td>1.59</td>
<td>59.3</td>
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Conclusion

The analysis of NIS leads us to scrutinise the R&D strategies of various companies that act within a wider-ranging institutional framework in order to coordinate and streamline the various actions they undertake to stay competitive and increase market share. We also have to pay heed to the fact that besides the institutional context in which they act, firms may embark upon courses of action other than just R&D, such as getting information and/or accessing knowledge with respect to their production or their markets, or activities entailed by the process of outsourcing the research outputs, by ensuring an active interface between users and producers of R&D.

Therefore, it is clear nowadays more than ever, that in economies which increasingly become knowledge-based, the range of activities taken into consideration with respect to the R&D processes is constantly expanding. Besides outsourcing, R&D development can be engendered in the shape of cooperation, seen as separate from outsourcing. We have witnessed over the last years the creation of many strategic alliances, most of them technology-oriented (sharing some R&D, developing common standards, etc.). Such alliances were in general made between multinationals, which adds a transnational dimension to the process.

Some other aspects that are especially noteworthy with reference to the efforts carried out by different firms to enhance R&D outputs, are obviously the activities towards assessing the direction of markets or the need of users in order to innovate and develop their market share, or activities geared at developing a qualified labour force, whose skills and knowledge may be attuned to the new needs and new scientific breakthroughs.
Bearing in mind all the above, it is therefore obvious why there was this need for a systemic approach to R&D in knowledge-based economy. Nevertheless, it has to be noted that the knowledge and innovation systems of countries display visible differences that arise in conjunction with their individual paths of specialisation in production. Consequently, it is important to study the weaknesses which are most pivotal for national economic growth and development, and not necessarily apply a policy which proved successful in the case of another country.

Recommendations

Increased performance in relation to science, technology and innovation would assist the process of transition and attainment of higher levels of economic growth. Since economic growth and competitiveness are partly founded on a well-functioning NIS in which all actors, market-oriented and non-market institutions need to perform efficiently, an extensive evaluation of NIS is needed in order to highlight the interactions and interfaces between various actors and the workings of the system as a whole, as well as how it could be improved. SMEs are at the core of a well articulated NIS and therefore, strengthening SMEs capacities in relation to STI related activities will boost NIS performance.

According to the National Research, Development and Innovation Strategy 2007-2013, published in December 2006 by the Government of Romania, Ministry of Education and Research, the National Authority for Scientific Research (MER-NASR), several directions for action have been identified. If these policy recommendations will be carried out into practice and if these actions will be monitored strictly and applied within the larger perspective of a systemic approach to NIS, our country will improve its performance in the RDI field: (1) Gearing the research efforts towards clearly identified problems, by involving demand representatives in the RDI projects, in particular the private demand, but also the demand of the national or regional public authorities; (2) Support for RDI resource concentration (human, infrastructure, organisational) in poles of excellence, able to compete at international level and involve the Romanian companies in research activities; (3) Incentives for maintaining the cooperation structures besides the horizon of a single project, by setting up dedicated entities; (4) Sustaining enterprise pre-competitive research through adequate financial and support tools; (5) Stimulating universities and public R&D entities to establish and develop entities of interaction with the private environment, where the experimental basis for joint projects, as well as the framework for technology transfer and personnel exchanges, will be provided; (6) An increased cohesion of the innovative entities from the public and private sectors, through the development of innovation networks, participation to technology platforms and the development of science and technology parks; (7) Support for the innovation based entrepreneurship by developing services in innovation incubators, by improving the access to risk capital and by providing training in the field of innovation management; (8) Fiscal incentives for RDI investments of firms, along with an adequate mode of recording those expenditures; and (8) An increased access of SMEs to information related to research results, to funding and cooperation opportunities, through dedicated support services.

In conclusion, the present paper has analysed the NIS, from a larger perspective and the current situation of RDI in Romania. The analysis provided in this paper represents just the starting point for a more in-depth and systematic approach to RDI and NIS related processes in Romania. However, the policy recommendations, as laid down by the Government of Romania in its RDI Strategy 2007-2013 RDI Strategy are worthwhile and need to be implemented in reality.
References


Integrating Online and OnCampus Education Delivery
Using Innovative Strategy and ICT Tools

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Abstract

The advances in Internet Technologies and Web Applications have made Blended Learning (F2F+Online) a welcome reinvention of education in the formal higher education institutions all over the world. In the Philippines, formal blended learning is taking off in a very slow manner. To speed up the adoption of formal blended learning the researcher started putting up the blended mode of education delivery in the Graduate School of the Philippine Women’s University (PWU) in 2003. Having succeeded in this initial venture, the researcher proceeded in helping the Philippine Normal University (PNU) accomplish the establishment of e-Learning in 2008. The La Consolacion College Manila (LCCM) invited the researcher in 2009, to realize their school’s slogan: “Reinventing Education for the Future.” Currently, all the regular and special courses at LCCM have online components. In this paper, the researcher will discuss in details the strategies and the blended learning experiences at PWU, PNU, and LCCM. Also, this paper provides the details on how the researcher accomplished the foregoing strategy at the La Consolacion College Manila.

Keywords: Online learning, blended learning, online education, learning management system, virtual classroom
Background

The advances in Internet Technologies and Web Applications have made Blended Learning (F2F+Online) a welcome reinvention of education in the formal higher education institutions all over the world. In the Philippines, formal blended learning is taking off in a very slow manner. This paper discusses in details the strategies made in putting up blended learning and the blended learning experiences at PWU, PNU, and LCCM. Part of the strategies in establishing formal blended learning is to make the systems and processes created, user-friendly and would require very minimal capital investment. In so doing, the quality of education greatly enhanced; as well as learning. School administrators would have only to do a minor re-alignment of the school budget.

Discussion

The Strategy in Establishing Blended Learning

The primary strategy that the researcher followed, hinged on the development of an online learning platform that focuses on a Learning Management System (LMS). Choices that the researcher had were to purchase a commercially-available LMS (e.g. WebCT or Blackboard), get an Open Source LMS (e.g. Moodle), and self-develop an LMS (which the researcher can do being already an accomplished Web Applications Developer).

Many local academic institutions cannot afford to purchase the WebCT or Blackboard. The University of Santo Tomas (UST) has Blackboard with a licensing cost of around one million pesos (Php 1M) per year. University of the Philippines Open University (UPOU) and De La Salle University (DLSU) have Moodle. They get the standard Moodle free. To configure Moodle and administer it requires them to have a regular team of PHP & MySQL professional programmers. This makes Moodle also an expensive choice. The option left for the researcher is to self-develop an LMS. An LMS that will not require big budget in the development, operation, administration and management. To make it readily acceptable to the users, the researcher had to design it very user-friendly and with features that will enhance learning among the users.

The Design of the Self-Developed LMS (AERVLES)

A Learning Management System (LMS) [also popularly known as a Virtual Learning Environment System (VLES)] is a software system designed to facilitate management of educational courses for the teachers and students, especially helping teachers and learners with course administration. The system can often track the learners' progress, which can be monitored by both teachers and learners. While often thought of as primarily tools for distance education, they are most often used to supplement the face-to-face (F2F) classroom setting. Thus, Blended Learning (F2F+Online) came to existence.

This system usually runs on servers, to serve the course to students and teachers appearing as Web pages. Components of this system usually includes templates for content pages, discussion forums, chat (not recommended for formal academic courses), quizzes and exercises. Teachers fill in the templates and then release them for learners to use. Services generally provided include access control, provision of e-learning content, communication tools, and administration of the user groups.

The design of the AERVLES platform is patterned after that of the Yahoo!Groups platform (http://groups.yahoo.com/).

The application development software the researcher used is PHP (http://php.net/) with database MySQL (http://www.mysql.com/). These are all Open Source software (no license fee). The scripts are embedded in HTML documents.
All the scripts and databases are hosted in a server provided by a Webhosting Provider in the United States. The initial two (2) years service costs $166.80 from Bluehost.com. With this, the purchase of a server is no longer needed. Bluehost provides unlimited server space. Also, there will be no need of technical personnel to maintain and operate the server (Bluehost provides highly professional technical support through extra-fast Live Chat).

To make the AERVLES more robust, the researcher added a system for administering the registration and assigning of teachers and students to the subjects being conducted online. In addition, the researcher have developed a system for monitoring the conduct of the online courses by the Dean or by an Academic Supervisor. All these systems are integrated in the AERVLES.

Training

The next part of the Strategy is the training of the teachers in conducting online courses. The training is not focused on the use of the technology but more on the online pedagogy. Practically every teacher is familiar in using emails (this trains the teacher already on how to use the computer and the Internet). The teachers have long been drilled already in their face-to-face (F2F) classroom teaching. Online pedagogy includes the F2F teaching strategies. One innovation the researcher have introduced in the training of teachers is the use of e-book format for the production of the course materials. The researcher used the software DeskTopAuthor. You may visit the website to see all the possible things you can do in using it (http://www.desktopauthor.com/). Also, visit DrRefr’s e-Book Writing Tutorial: http://www.teachlearn-online.net/ebookwriting/.

The students do not need the training anymore. As they proceed and be immersed in their online learning inside the Virtual Classrooms, they simply get on-stream naturally. Besides, the Manual on how to use the AERVLES is freely available and downloadable from the Virtual Classroom.

The Learning Management System Using AERVLES Virtual Classrooms

The AERVLES is depicted in the Figure 1 on LCCM Online Education. The Virtual Classroom features are shown in Figures 2, 3, and 4. Its framework is based on an integrated model where most of the learning takes place via collaborative online activities, and content is largely determined by the learners, either individually or as a group. Learning is very much student-centered and highly collaborative.
The LCCM Online Education: http://www.lccm.edu.ph/online.php.

*Figure 1.* LCCM Online education main page

*Figure 2.* LCCM online education student login page
Figure 3. LCCM online education student classes

![LCCM online education student classes](image1)

Figure 4. LCCM online education student virtual classroom

![LCCM online education student virtual classroom](image2)
The AERVLES is a single piece of software, accessed via standard Web browsers, which provides an integrated online learning environment. It can be used to support flexible and distance learning. It includes the following functions.

1. **Controlled Access.** This means controlled, secure, access to the curriculum that has been mapped, to elements which can be separately assessed and recorded. It allows the organization of students into virtual classes, with individual, secure log-ins. Content is organized in elements or modules and mapped to learning outcomes of programs, linked to the units of which they form a part. Students should have their own individual, customized workspaces.

2. **Student Tracking.** Tracking student activity and achievement against these elements using simple processes should make it possible for tutors to define and set up a course with accompanying materials and activities to direct, guide and monitor learner progress. The AERVLES allows recording of certain basic information about students, irrespective of the learning context, including registration details, course details, course prerequisites, qualification aims, study time and tracking information. It offers comprehensive tracking and recording facilities. For example, it automatically records individual students' log-in time and dates, length of time online, what content has been read and how often, assessments completed, with dates and times of these activities. Ideally, the username and passwords used to control access to the AERVLES is the same as those used for other systems within the institution, to allow a 'single log-in'. It should not be necessary for a user to log in several times to access different systems.

3. **Resources and Materials.** The AERVLES supports online learning, including access to learning resources, assessment and guidance. The learning resources may be self-developed or professionally authored and purchased materials. The AERVLES is able to support a variety of content formats, not only hypertext markup language (HTML). It can easily transfer content between VLEs either because institutions (or consortia) have different VLEs or because it is necessary to change VLE (in light of circumstances such as the supplier going out of business). The AERVLES provides a simple method of uploading content into the environment, so that it is then available for the creation of learning programs and pathways. Methods of doing this will vary from simple drag-and-drop to more complex uploading processes, including batch uploading of files and courses. Once uploaded, contents’ elements have to be assembled into programs of learning, which will mean devising pathways through the content, creating hierarchical structures, building links, etc. Again, the way this is implemented should make it easy for non-technical staff to use. From the students point of view, the AERVLES offers simple navigation tools through the content, and they should be able to access their own course details and performance information.

4. **Communications.** This includes communication between the learner, the tutor and other learning support specialists. There are three basic methods of communication within the AERVLES: email, bulletin boards and asynchronous discussion rooms. These facilities are likely to be heavily used to support the students and can be used for portfolio and assessment purposes.

5. **Links.** This means links to other administrative systems, both in-house and externally. The AERVLES integrates easily with core administrative/management systems which are IMS standards-compliant. Its data should be seamlessly shared with the MIS system.

6. **Customization.** The AERVLES is customizable. It allows the look and feel of the user interface to be customized, so that it can easily be redesigned to appear in the college colors, display the college logo, etc.
The Academic Supervisor features are shown in the following figures:

*Figure 5. LCCM online education academic supervisor’s room*

The Academic Supervisor is equivalent to the Coordinator of a group of teachers. The Academic Supervisor facility empowers the Coordinator to monitor the virtual classrooms of the teachers being coordinated. The virtual classrooms can only be viewed.

In this manner, the Coordinator will be able to determine how the teachers he/she is coordinating are conducting their online courses.
Figure 6. LCCM online education faculty listing page

Figure 7. View of faculty virtual class
The Administrator features are shown in the following figures:

*Figure 8. LCCM online education administrator virtual room*

*Figure 9. LCCM online education faculty loading page*
Conclusion

Delivery of formal courses in a blended mode (F2F+Online) is not yet widespread in the schools in the Philippines. The researcher has developed a strategy that will not involve a very costly process in establishing blended learning. The AERVLES (an LMS developed by the researcher) is very user-friendly to both the faculty and the students. Furthermore, it empowers the Deans to monitor all the teachers which is impossible to do in a face-to-face classroom setting. The acquisition cost of the AERVLES is affordable. The administration and management costs are similarly affordable (visit http://www.teachlearn-online.net/aersow/).

The use of this AERVLES in the Online Education of the Philippine Women’s University (see Appendix I), of the Philippine Normal University (see Appendix II), and of the La Consolacion College Manila, has demonstrated its cost-effectiveness and user-friendliness.

References

DrRefre’s School on the Web. (2010). Available from http://www.teachlearn-online.net/aersow/


Appendix I

The PWU Distance Education: http://www.pwu-online.net/

*Figure 11.* PWU distance education student login page

*Figure 12.* PWU distance education main classroom
Figure 13. The student virtual classroom of PWU

The features of the Virtual Classroom:
1. Bulletin Board for announcement
2. Course Contents for posting course materials.
3. Posted Files for posting assignments and works
4. Web References for posting websites that can be used as references
5. Class Discussion for collaborative learning through asynchronous discussion
6. Class Members for list of the members
7. Grade Check for seeing grades
8. Online Users to see who are also currently online
Appendix II

The PNU Online Education: http://www.pnu-online.net/

*Figure 14.* PNU online education main page

![PNU online education main page](image1)

*Figure 15.* The student login of PNU online education

![Student login of PNU online education](image2)
Figure 16. PNU online education main classroom

Figure 17. The student virtual classroom of PNU online education
The Impact of the Global Economic Crisis on the Romanian Small and Medium Size Enterprises and their Management

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Abstract
The current global and economic crisis is having a significant impact on companies regardless of country, business sector, or size of the company. However, depending on the strength, sophistication, or connection of national economic system to global economy, the crisis impact largely varies. Romanian economy is such a case; for some reasons the crisis impact should be harder, for other reasons softer, nevertheless delayed – as its effects are visible in 2010. This paper presents some of the results of the research conducted in early 2010, on the effect of the global financial and economic crisis to Romanian small and medium size enterprises (SMEs) vs. large ones, their short-term decisions, strategy changes, and possibly to identify how fast their managers reacted. Amid the large number of papers on the current global crisis, this article continues the author’s previous research on Romanian SMEs and entrepreneurial spirit, bringing original elements and adding value. One surprising output is that SME’s decision makers – in spite of their entrepreneurial skills – clearly display a certain lack of management skills, knowledge and culture, and understanding of strategic management. Hence, the need for solid business education and training programmes in management subjects like decision making, leadership and strategy.

Keywords: Global financial and economic crisis, decision making, business strategy, Romanian SMEs (Small and Medium size Enterprises), management education and training
Background

The June 9, 2010 Newsletter to the members of the Bloomberg Businessweek Market Advisory Board has shared the results of a survey conducted in May 2010 on the US economy. Survey says this: “Though business leaders are expressing optimism, their view of when the economy will come out of recession continues to shift into the future. For example, one out of four executives (24%) think the economy will come out of the recession by the end of 2010 while nearly half (48%) say it will take until sometime in 2011 for the economy to come out of recession; this is up from February 2010 when 37% of executives said they thought the economy will come out of recession in 2011. Interestingly, one out of six executives (16%) says that the recession is already over”.

More optimistic, the spring forecast of the EU Commission (2010) states that the EU economy is on its way to catch up. The most severe recession in the whole European economic history is almost gone and the EU economy will grow by 1% in 2010 and 1 ¼ % in 2011. Labour market will stabilize at a level up to 10% in 2010 (EU average). The temporary measures of fiscal policy have had a key-role in this stabilization process – but the price paid is the pretty high public deficit (estimated as high as 7 ¼% from PIB in 2010). However, these figures and the growth percentage will be different from one member state to another, depending on specific economic conditions and policies applied (EU Commission, 2010).

The global character of the crisis is still a matter of debating. Was it a global crisis or just a North American and European one? Because the weight of Europe in global economy went down from roughly 30% to 19% only; the difference was caught by the Asian countries (Gorzelak, 2010). Anyway, it is agreed that the American financial crisis of 2007-2009 has generated the global financial crisis of 2008-2009, thus leading to the current recession by the end of this decade.

The current global financial and economic crisis is having a significant impact on companies, regardless the country, business sector, or size of the company. Nevertheless, depending on how strong, how sophisticated or how much a national economic system is connected to the global economy, the crisis impact largely varies – mainly as strength and lag time (delay). Romanian economy is such a case; for some reasons the crisis impact should be harder, for other reasons softer, but anyway delayed – as its effects are visible in 2010. The purpose of this paper is to present some of the results of the research conducted in early 2010 on how the global financial and economic crisis has impacted the Romanian small and medium size enterprises (SMEs) vs. large ones; their short-term decisions, strategy changes, and possibly to identify how fast their managers reacted.

Consequently, the paper’s structure is this: short theoretical framework; research objectives and methodology; results followed by discussion and conclusions. Some limitations and further research are suggested as well.

Introduction: Theory Framework

The purpose of this paper is not to frame a theory or history of financial or global crises. However, it is worthy to mention that the term “financial crisis” is largely applied to many situations in which financial institutions lose a significant value, abruptly and unexpectedly. Over the last two centuries, many financial crises were associated with banking panics, stock market crashes and the bursting of other financial bubbles, currency crises, and sovereign defaults (Kindleberger & Aliber, 2005; Laeven & Valencia, 2008).

The economic crisis mechanism is intimately associated with the theory of free-market economy. The current global crisis gave credit to Minsky’s model of the credit system: Minsky (1986, 2008) stated that the free-market financial system swings between robustness and fragility (i.e. business cycle); after recession periods, companies expect profit raise and lenders hope that the loans will be repaid – hence the risk aspect. The development is expectation-based and, more and more, speculation-based – as Dalai Lama has identified the crisis’ roots, giving an interview (Hamm, 2009):

- Too much greed (money is important but there are other values as well – family etc);
• Excessive speculation;
• Lack of transparency – related to financial transactions.

Minsky (1986, 2008) has argued that the booms and busts that accompany the economic cycles are not avoidable (in free-market economic systems) – unless government and central bank intervene through regulations and control mechanisms (which is documented true during the current crisis).

The current global financial and economic crisis has brought not only practical turbulences for most of the world economies but stimulated theoretical research and brought in full light and visibility authors like Nassim Nicholas Taleb. Taleb (2007) wrote “The Black Swan” (before the financial crisis which started in 2008!) warning the bankers about using in excess probabilistic models and missing the possibility of catastrophic events (“black swans”). As Taleb is arguing, “the models used to measure and contain risk were inherently flawed because they did not – and could not – take into account the existence of black swans, or unpredictable, potentially disastrous events” – as quoted by Silver-Greenberg (2010).

To note the beautyfulness of the metaphor: “black swans” are just highly improbable events (“only white swans exist” was the general belief until black swans were discovered in Australia in 1697!)

“Black Swan events are almost impossible to predict. Instead of perpetuating the illusion that we can anticipate the future, risk management should try to reduce the impact of the threats we don’t understand” (Taleb, et al., 2009, p. 78).

The current financial crisis was such an unexpected black swan. However, beside Taleb’s, there were other voices who predicted the financial apocalypse (Silver-Greenberg, 2010). Amid these warnings, the crisis made significant victims. Were they unavoidable? Trying to answer this question, five experts discussed the future of enterprise risk management (Kaplan et al., 2009): “Many of the elements of the crisis were being talked about long before it happened. Analysts had been questioning the sustainability of the subprime business well before the meltdown. Macroeconomists had been worrying about the U.S. current account deficit … Other people were writing about the imperfections of rating models. What we didn’t see was how the elements were interacting. And that meant we were blind to the risk that the whole system would break down” (p.70). One of the major conclusions is that risk management is currently switching to risk managers (CRO = Chief Risk Manager): “Clearly, risk officers have a huge role to play, but we don’t want to transfer the responsibility for risk from operating general managers to CROs and then feel that the problem is solved” (Kaplan et al., 2009, p.75).

In order to better manage the risk, six mistakes must be avoided (Taleb et al., 2009): (1) Think that we can manage risk by predicting extreme events (actually, we can not); (2) Studying the past will help us manage risk (high-impact & low probability events – as current crisis – have no precedents); (3) Don’t listen to advice about what we should do; (4) Risk can be measured by standard deviation; (5) What is mathematically equivalent is psychologically so (in fact, it is not); and (6) Efficiency and maximizing shareholder value don’t tolerate redundancy (in reality, redundancy is a means of managing the risk).

The myth of the rational market is gone (Fox, 2009). The “black swan” events are behind standard deviations corresponding to most of changes (+/-1). “Long-tail risk” is the term coined in relation to bell-shaped curves that describe probabilistic distributions – as the curves used to forecast the probability of gains/losses in a given market (Harrington, et al., 2010). The longer the deviation: (1) the most probable outcomes lie at the center of the curve; and (2) the least probable events (extreme gain or extreme loss) are plotted at the “tails” of the bell-shaped curve (very end or very beginning of the curve). The unfamiliar and difficult-to-predict events make the decision process incomparably more difficult.

The management is a complex process even in stationary systems; in turbulent periods its complexity increases exponentially and all the company functions are affected accordingly. Operations, finance, human resource, marketing are all exposed to the new challenges. The major lesson [that should have been] learnt during the previous economic crises: smart managers simply do not cut the costs of
training human resource, research-development-innovation, and marketing! Here are some recent confirmations.

A lesson taught by the crisis is presented by the Director of the Center for European Regional and Local Studies (Gorzelał, 2010) as ‘Slovenian example’: in order to be competitive after the crisis, just invest in R&D, innovation, and (higher) education!

As two downturns are not exactly alike, Quelch and Jocz (2009) offer 7 smart ways to economize on advertising as a good management reaction to consumers’ strict priorities and reduced spending. This is a strong argument against typical reaction of common managers to cut costs, reduce prices and postpone new investments.

Rigby et al. (2009) pay special attention to “unwise cost cutting during hard times”; as the decisions about cutting are made by analytic (left-brain) leaders, they recommend creative, innovative (right-brain) managers in leadership positions – only they are able to build and sustain a culture of creativity and innovation which ultimately makes the company competitive in a global market. The positive examples start with Apple’s CEO Steve Jobs.

Finally, the current global crisis has impacted the way managers think strategically. Before the crisis, the trend was towards the longer term decisions (time horizons significantly longer than regular strategy terms of five years). Foresight exercises and scenarios started to be more and more common in order to design strategies by sectors or regions (time horizons of 10-15 years were not uncommon). The global crisis is having a contrary effect: five years horizon seems to be too long for strategic decisions, because of the turbulences caused by the economic crisis. It is interesting to watch the next phase of management practice: Will it continue to be the classical strategic management (five years time horizon, more or less)? Will it evolve to longer term foresight exercises and scenarios? Will it become more conservative and risk averse, ultimately (like ‘three-year-strategies’)?

Looking for answers, the management gurus are not forgotten. Excerpted elements from Peter Drucker’s previous works are brought to light by Kanter (2009): self-regulate the company in order to avoid overregulation by the government; reform the compensation system in order to avoid public outrage over executive pay; professionalize the boards of directors; and long-term-vision is critical to leading through turbulent times.

At any rate, the strategic management and strategic thinking is the key-answer. Although, the flexible strategy is preferred to rigid strategic planning: as the range of possible futures is large and uncertainty high, “the companies that nurture flexibility, awareness, and resiliency are more likely to survive the crisis, and even to prosper” (Bryan & Farell, 2009, p. 24). On the other hand, a crisis is an opportunity in disguise (Rumelt, 2009, p. 35): “To survive – and, eventually, to flourish – companies must learn to exploit it.” This crisis definitely marks a new era in management.

This is why the focus of this paper is not to display the history of crises or investigate their causes but to try to offer an image of the way the Romanian managers reacted to this crisis: how well, how fast, how effective, and how professionally they acted. In the meantime, waiting for the next breakthrough theory which will enlighten the subject, let us have a look again and think a while at this global crisis’ causes – as seen by Dalai Lama: too much greed, speculation, lack of transparency. Greed is good but …

Research Objectives

Addressing the research problem of finding how the managers of Romanian SMEs have reacted to the global crisis, a suite of specific research objectives was set:

1. How fast they reacted; is the corresponding lag time depending on company size?
2. What impact the crisis had on company strategy: did it change or not? If yes, how?
3. Which were the most common decisions made by the managers under the pressure of the crisis; where there any mistakes made? What sort of? Is there a reason behind?
4. How the crisis has impacted the firm overall performance, in the managers’ view?
Methodology

The research methodology is interview-based. A questionnaire was designed for this purpose – to match the research objectives. It was pretested, reviewed, and finally sent to a target sample of 250 companies (about 1% of total number of firms currently active in Romania). As the research is having an exploratory character, there was no discrimination between small and large companies – in order to eventually identify SME specific traits. Even single-person businesses were included in the sample.

Other non-discriminatory issues in developing the questionnaire were the company age and industry, as well as the respondent: not only business owners and top managers, but also other managers were invited to answer the questionnaire.

A sub-adjacent objective of the survey was to explore the managers’ business management culture, the way they understand business strategy, and decision making process. According to the answers obtained during this phase of the research, the questionnaire is going to be finer tuned and focused to representative sample categories of businesses (by size and age of the firm, industry, or region).

Results and Discussion

The process of data collection ended with 227 valid answers – over a period of four months, between January and May 2010. The demographic features are depicted below: company size (Table 1), industry (Table 2), and age of the firm (Table 3).

Table 1
The structure of companies by size (n = 227)

<table>
<thead>
<tr>
<th>Company Size *</th>
<th>Number of Companies</th>
<th>[%]</th>
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</thead>
<tbody>
<tr>
<td>Micro-enterprise (1 to 9 employees)</td>
<td>62</td>
<td>27.31</td>
</tr>
<tr>
<td>Small company (10 to 49 employees)</td>
<td>50</td>
<td>22.03</td>
</tr>
<tr>
<td>Medium-size company (50 to 249 employees)</td>
<td>36</td>
<td>15.86</td>
</tr>
<tr>
<td>Total SMEs</td>
<td>148</td>
<td>65.20</td>
</tr>
<tr>
<td>Large company (over 250 employees)</td>
<td>79</td>
<td>34.80</td>
</tr>
<tr>
<td>Total</td>
<td>227</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Note: * according to Romanian legislation – harmonized with the EU legal framework.

As previously specified, the sample was not designed to be representative in terms of overall structure of Romanian SMEs vs. large ones. It aimed at having enough members in each category in order to be able to characterize that category and, finally, to draw conclusions related to SMEs, eventually vs. large companies.

Table 2
The structure of companies by industry (n = 227)

<table>
<thead>
<tr>
<th>Industry the Company is Active in:</th>
<th>Number of Companies</th>
<th>[%]</th>
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<tbody>
<tr>
<td>Production of goods</td>
<td>40</td>
<td>17.62</td>
</tr>
<tr>
<td>Provision of services (Tourism and Transports included)</td>
<td>127</td>
<td>55.95</td>
</tr>
<tr>
<td>Constructions</td>
<td>14</td>
<td>6.17</td>
</tr>
<tr>
<td>Commerce</td>
<td>46</td>
<td>20.26</td>
</tr>
<tr>
<td>Total</td>
<td>227</td>
<td>100.00</td>
</tr>
</tbody>
</table>

More than half of the respondent firms is providing services (as Tourism and Transports business were included in this group). The significant weight of the commerce companies is specific to SMEs.
Table 3  
*The structure of companies by their age (n = 227)*

<table>
<thead>
<tr>
<th>Company Age *</th>
<th>Number of Companies</th>
<th>[%]</th>
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<tbody>
<tr>
<td>Less than one year</td>
<td>5</td>
<td>2.20</td>
</tr>
<tr>
<td>Between 1 and 2 years **</td>
<td>16</td>
<td>7.05</td>
</tr>
<tr>
<td>Between 3 and 5 years</td>
<td>47</td>
<td>20.70</td>
</tr>
<tr>
<td>Between 6 and 9 years ***</td>
<td>38</td>
<td>16.74</td>
</tr>
<tr>
<td>Between 10 and 20 years ****</td>
<td>83</td>
<td>36.57</td>
</tr>
<tr>
<td>Over 20 years</td>
<td>38</td>
<td>16.74</td>
</tr>
<tr>
<td>Total</td>
<td>227</td>
<td>100.00</td>
</tr>
</tbody>
</table>

*Note: * in years, since the legal establishment.

** Threshold related to the time the crisis has started

*** Threshold related to the time the economic transition has ended in Romania (by 2000)

**** Threshold related to the time the economic transition has started in Romania (1990)

Expectedly, most of the companies were established during the ten years transition period, and the smallest number after the emergence of the crisis; just a few last year.

This structure is self-speaking: during three years of liberalism (2005-2007) there were more start-ups than in previous four years (2001-2004) – which is probably true for the whole enterprise population.

Table 4 offers the necessary figures for a documented answer to the first objective (i) of the survey: how fast the firms reacted.

Table 4  
*The distribution of the moments by when the company has reacted facing the global crisis – by company size (n = 227)*

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<tbody>
<tr>
<td>Micro-enterprises</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Small companies</td>
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<td>0</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>3</td>
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<td>3</td>
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<td>3</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>1</td>
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<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Total SMEs</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>17</td>
<td>4</td>
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<td>7</td>
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<td>4</td>
<td>9</td>
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<td>10</td>
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<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Large companies</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td>7</td>
<td>6</td>
<td>4</td>
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<td>1</td>
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<td>Total</td>
<td>3</td>
<td>7</td>
<td>5</td>
<td>16</td>
<td>8</td>
<td>41</td>
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<td>11</td>
<td>15</td>
<td>12</td>
<td>15</td>
<td>25</td>
<td>15</td>
<td>25</td>
<td>23</td>
<td>13</td>
<td>26</td>
<td>10</td>
<td>18</td>
<td>10</td>
</tr>
</tbody>
</table>

*Note: * as in Table 1.

** totals are not identical to those in Table 1 – as many as 22 companies were not able to identify the reaction timing

The figures suggest that: (1) First reactions to crisis were visible as far back as in August 2008, and a clear maximum in January 2009; (2) Between January 2009 and January 2010 there is an
oscillatory but continuous significant level of reaction; *this means a lag time of about one year*; and (3) After January 2010, reaction level calms down apparently; however, it is not clear if this decline means lack of reaction in reality or it is just because the survey ended by May 2010.

Another observation is the visible similarity between variations in time of Total number of reactive SMEs – on one hand – and Total number of reactive companies (regardless the size) – on the other, confirmed by the statistical calculation of the corresponding coefficient of correlation:

\[
\text{Corr Reaction \{SMEs, Total\}} = 0.970673
\]

This is considerably higher than the large companies’ corresponding coefficient:

\[
\text{Corr Reaction \{Large, Total\}} = 0.699702
\]

The immediate consequence is that reaction of the SMEs can be estimated by assessing the reaction of all companies.

The reaction of the large companies is not alike: they seem to be more delayed (there is a second maximum of reaction in September 2009). The different behaviour of SMEs and large companies is supported by the calculation of the same coefficient:

\[
\text{Corr Reaction \{SMEs, Large\}} = 0.507429
\]

Deeper investigations might be conducted trying to identify other possible correlations: if the corresponding lag time is depending on company age or industry.

Table 5 depicts the impact of the crisis on the company’s strategic approach (i.e. second research objective): the companies decided to change or not their strategy, with the aim of better addressing the challenges raised by the crisis.

<table>
<thead>
<tr>
<th>Company Size</th>
<th>Strategy Change</th>
<th>No Change</th>
<th>Confusion **</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>number</td>
<td>[%]</td>
<td>number</td>
<td>[%]</td>
</tr>
<tr>
<td>Micro-enterprises</td>
<td>10</td>
<td>25.00</td>
<td>33</td>
<td>25.58</td>
</tr>
<tr>
<td>Small companies</td>
<td>7</td>
<td>17.50</td>
<td>33</td>
<td>25.58</td>
</tr>
<tr>
<td>Medium-size companies</td>
<td>4</td>
<td>10.00</td>
<td>20</td>
<td>15.51</td>
</tr>
<tr>
<td>Total SMEs</td>
<td>21</td>
<td>52.50</td>
<td>86</td>
<td>66.67</td>
</tr>
<tr>
<td>Large companies</td>
<td>19</td>
<td>47.50</td>
<td>43</td>
<td>33.33</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.00</td>
<td>129</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Note: * as in Table 1.

** Confusion means that respective company called a regular decision (as cutting bonuses) as a strategic decision

It is surprising to note that: (1) As little as 40 companies (17.62%) decided that the crisis calls for extreme decisions – which is changing the company’s strategy; (2) Three times more companies (129) made no change in their strategies; and (3) There is a worrying good part of 58 companies that consider routine decisions as strategy change – which is a strong evidence of lacking the elementary managerial culture.

Analysis by company size shows that confusion is more common among SMEs (specifically microenterprises and medium-sized companies) compared to larger companies.

“No change policy” does not reveal any difference by company size but the strategy change is less appealing to SMEs.

The most common strategies among SMEs are: retrenching (7 cases), consolidation (3) and diversification of activity (3), while large companies prefer to approach new markets (5 cases) or relocate their operations (3).
The most frequent decisions made by the managers under the pressure of the crisis (the third research objective) are presented in Table 6.

Table 6
The types and frequency of decisions made under the pressure of crisis – by company size

<table>
<thead>
<tr>
<th>Company size *</th>
<th>Layoffs [%]</th>
<th>Cost cutting</th>
<th>Other decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Research-Development-Innovation</td>
<td>Training</td>
</tr>
<tr>
<td>Micro-enterprises</td>
<td>27</td>
<td>24.55</td>
<td>6</td>
</tr>
<tr>
<td>Small companies</td>
<td>28</td>
<td>25.45</td>
<td>8</td>
</tr>
<tr>
<td>Medium-sized</td>
<td>19</td>
<td>17.27</td>
<td>4</td>
</tr>
<tr>
<td>Total SMEs</td>
<td>74</td>
<td>67.27</td>
<td>18</td>
</tr>
<tr>
<td>Large companies</td>
<td>36</td>
<td>32.73</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>100.00</td>
<td>34</td>
</tr>
</tbody>
</table>

Note: * as in Table 1.
** The totals do not match the total number of companies (227) because more than one decision per company was allowed.
*** Max three decisions (other than layoff and cost cutting) per company.

The key results are: (1) By large and far cost cutting is the first reaction of the companies in front of the crisis; however, SMEs are less inclined to it; (3) Almost half of the companies (lightly more SMEs than large companies, proportionally) decided to lay the employees off as second major solution of crisis; and (3) Other decisions (beside layoff and cost cutting) are less known and used by SMEs.

Most frequent such decisions were: freezing the salaries and hiring process (very much related to previous cost-cutting ones), price discounts, sales promotions, but also renegotiate contracts, better organizational chart and task assignment. Although three decisions were allowed to be mentioned by respondents, the average is under one per company (lower in case of SMEs), showing lack of managerial skills.

In-depth analysis by types of SMEs might be further performed. Nevertheless, the examination of the decisions made by types of costs which were cut is more important: (1) It is encouraging that cutting the research-development-innovation costs is less frequent than cutting the administrative costs (more evident in case of SMEs – which is very positive aspect); and (2) Unfortunately, cutting the costs of training and marketing research and promotion is predominant (the second more evident in the case of SMEs).

The last research objective is fulfilled by the data presented in Table 7: How the crisis has impacted the firm overall performance, in the respective managers’ view: the perceptions range widely from disastrous to neutral to clearly positive (intermediary states included).

Table 7
The crisis impact on companies’ overall performance – as perceived by their managers, by size of the company (n = 227)
Overall, the impact of the crisis is seen as negative – ranging from slightly negative to neatly negative to disastrous (168 companies out of 227, which is about 74%). For the SMEs, the percentage is even higher: 79.05% (117 out of 148) as compared to the large companies (merely 64.56%): 51 companies out of 79. This means that crisis is more severe for the SMEs. Complementally, the crisis is having a positive impact for only 6.76% SMEs (10 out of 148 companies) as compared to 13.94% (11 out of 79) in case of large companies. In addition, the neutral impact is smaller for the SMEs (21 out of 14.19%) than for large companies (21.52%); the SMEs’ decision is sharper: they “see in black-and-white”. The SMEs are more sensitive to this crisis than large companies: the crisis is tougher for them, and they feel the crisis impact more clearly.

Correlation analysis shows high similarity between SMEs and large companies as far as crisis impact on the firm’s performance, as the coefficient of correlation demonstrates:

\[
\text{Corr Performance \{SMEs, Large\} = 0.930943}
\]

For this reason, it is not surprising that the correlation coefficient between the crisis impact on SMEs’ performance as compared to the impact on all companies’ performance (Total, in Table 7) is almost complete:

\[
\text{Corr Performance \{SMEs, Total\} = 0.99324692}
\]

Consequently, the crisis impact on SMEs’ performance can be estimated by assessing the performance of all companies.

This exploratory research aimed at identifying characteristic elements of the SMEs’ behaviour, under the pressure of the global financial crisis – by comparing them to large companies, regardless the age or industrial sector. For this reason, the target sample included a significant number of large companies (in higher proportion than respective representative percentage).

The results have matched the research objectives and promisingly create a foundation for further in-depth studies on correlations between SMEs’ reaction and their performance, eventually by size and age of the firm, industry, or region.

As the Romanian financial system is not as sophisticated as the Western one, it was expected a late and not devastating crisis impact on the firms. On the other hand, the SMEs are the economy’s most
dynamic and flexible sector (Scarlat, 2001, 2003). However, the dependency on the foreign corporations makes Romanian companies more sensitive to crisis, by transfer effect. The overall result was a delayed reaction of the Romanian firms facing the crisis (about one year lag time). It is an explanation but not an excuse from the management standpoint: in information technology era, there is no excuse for passive, inert management.

International statistics show that crisis is coming to an end (EU Commission, 2010). Considering the delayed reaction of the Romanian firms, combined with the hesitations in the public sector management, it is expected that Romanian crisis will last more. A research currently in progress conducted for a private client, shows that Romanians will dramatically cut their expenses in the following period (as follows: eating out, vacationing and entertainment, then alcohol & tobacco, clothing, electronics) – which will impact their purchasing capacity and, therefore, (small) business will suffer. It is not clear if the decline in SMEs’ reaction to crisis after January-May 2010 means really lack of reaction or it is just because the survey ended by May 2010. It is also a matter of further research.

Correlation analysis revealed an important aspect: there is extremely high correlation between SMEs responsiveness and system responsiveness to the crisis; i.e. reaction of the SMEs can be estimated by assessing the reaction of all companies. Same applies for estimating the crisis impact on SMEs’ performance.

It is surprising and worrying that more than one in four SMEs show serious lack of strategy knowledge and management culture. The proportion can easily by higher considering the possibility that “no change policy” (129 out of 227 companies) might cover the lack of any strategy! It is a lot of room and urgent need not necessarily for further research but mostly for training in management (strategy and leadership).

The limited arsenal of tools for fighting against crisis – as the research results demonstrate (lack of managerial skills - under the third research objective) – makes the list of the training subjects even larger. Analyzing the decisions made by SMEs facing the crisis unveils that cutting the costs of training and marketing research and promotion is predominant – which is far to be recommended during such periods (Quelch & Jocz, 2009; Rigby et al., 2009; Gorzelak, 2010).

The crisis is more severe for the SMEs. The impact of the crisis is seen as negative by 74% of the firms but the percentage is higher for the SMEs: four out of five firms. The SMEs are more sensitive to this crisis than large companies: the crisis is tougher for them, and they feel the crisis impact more clearly. Lack of management culture and managerial tools is certainly among the key-factors.

Overall, the research results are positive; some answers are offered but more questions arise. A few lessons were learnt to improve the research methodology – as format of the questionnaire (more focused on management issues like decision making cycle).

**Conclusion**

The results have matched the research objectives and promisingly create a soundly foundation for the future research.

**Late Recognition and Reaction**

The early reactions to the global crisis were reported as early as August 2008; January 2009 marked a maximum of activity but the SMEs’ reaction to the crisis kept high over all year. A lag time of one year is visible but there is no considerable argument for setting a definite deadline.
Lack of Strategy

Only one in six companies (17.62%) decided to change the strategy in order to cope with the crisis challenge. There are arguments for suspecting a large part of SMEs for having no real strategy. The most common strategies among SMEs are: retrenching, consolidation, and diversification of activity, while large companies prefer to approach new markets or relocate their operations.

Lack of Management Culture and Skills. Management Errors

The most frequent decisions made by the SME managers under the pressure of the crisis are personnel licensing and cost cutting as well as: freezing the salaries and hiring process, discounted prices, sales promotions, contract renegotiation, better organizational chart and task assignment – following to no clear strategy or set of priorities, unfortunately. Finer analysis unveils that cutting the costs of training and marketing research and promotion is predominant – which is far to be recommended during such periods.

Need for Management Training

The survey results disclosed that more than one in four SMEs show serious lack of strategy knowledge and management culture. There is urgent need training in management (strategy, leadership, managerial skills).

More Severe Crisis for SMEs

Overall, the impact of the crisis is seen as negative by 74% of the firms but the percentage is higher for the SMEs: over 79%. The SMEs are more sensitive to this crisis than large companies: the crisis is tougher for them, and they feel the crisis impact more clearly.

Ultimate Lesson

The research conclusions are equally useful for both scholars and practitioners: entrepreneurs and SMEs decision makers, as well as for management training institutions and universities, education policy makers who are participating in a life-long learning process striving to develop the leadership skills and managerial capacity within the Romanian SMEs.

This crisis has taught a tough lesson: the post-crisis world will not be the same; when the economy recovers, things will not return to normal.

This crisis definitely marks a new era in management.

References


Assessing Students’ Satisfaction: A Case Study

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Abstract

Customer satisfaction has roots in two ideas about quality. Firstly, quality can be measured by the gap between customers’ expectations and perceptions. Secondly, quality is seen as compliance to a standard or specification. The ISO 9001:2000 has clearly set that the central purpose of a quality management system is to ensure that the organization provides goods and/or services that satisfy customers. The customers for the services of a higher education institution fall into five groups: students, employees, employers, government and public sector, and the industry and wider community. The paper has focused a case study: POLITEHNICA University of Bucharest, and how the university implements ISO 9001:2008 in the area of customer focus and customer satisfaction. The purpose of the study has been to explore the phenomenon of students’ satisfaction using the European Customer Satisfaction Index (ECSI) at POLITEHNICA University of Bucharest, Romania (PUB). Finally, it attempts to explain how certain factors involving satisfaction affect one another. The study is a quantitative study of students’ satisfaction about their experience at the university. The findings were that satisfaction and loyalty can be managed and increased in a university setting, with positive results. As far as the importance of credible used values, it is not enough just to have a message, but evidence are needed concerning about validity of what is communicated.

Keywords: Students’ satisfaction and loyalty, European Customer Satisfaction Index, European Performance Satisfaction Index (EPSI)
Background

ISO 9001:2008 is very clear that the central purpose of a quality management system is to ensure that the organisation provides goods and/or services that satisfy customers. To quote from the introduction to the Standard:

“This International Standard promotes the adoption of a process approach when developing, implementing and improving the effectiveness of a quality management system, to enhance customer satisfaction by meeting customer requirements.”

Customer satisfaction largely depends on the degree with which a product supplied by an organization meets or surpasses customer expectation. By measuring customer satisfaction, organizations are able to get indication of how successful they actually are in providing products to the market (Ceobanu, Munteanu, Bobalca, & Anton, 2008).

Focusing on the customer is an essential principle of Total Quality Management, and the customers for the services of a higher education institution fall into five groups: The students, the employees, the employers, the government and the public sector, and the industry and wider community (Kanji, Bin, Tambi, & Wallace, 1999). The primary customers are the students (Hill, Lomas, & MacGregor, 2003). Without students to teach to, there is no business for higher education institutions, no research to conduct or service to provide. Without perceived value there is no reason for students to choose our institution over an increasingly large number of similar institutions. To raise that value, students’ perceived quality and satisfaction should be measured and managed (Martensen, Grønholdt, Eskildsen, & Kristensen, 1999). The understanding to the connotation of higher education student perception value is limited in the balance between price investment and quality for the product and service in the industry or general service industry, and ignores students’ influences of non-price investment in the long-term study process (Linying, Zhijun, & Qun, 2008).

PUB has started the implementation of TQM principles since 2002. As stated in ISO 9001:2008 one of the management responsibilities is the customer focus. If the organisation's mission is to satisfy the customer, then customer requirements must be determined (7.2) and feedback (8.2.1) as defined any comment on the organization’s performance provided by a customer (Hoyle, 2006).

Objectives of the Study

The measurement of student satisfaction can be useful to post-secondary institutions, to help them to pinpoint their strengths and identify areas for improvement. Satisfaction ratings go beyond teaching assessments, which have a narrow focus, to include broader aspects of the student learning experience. To grasp the complexity of that learning experience, it is not enough to know the degree to which students are satisfied, it is important to understand the factors that contribute to student satisfaction.

In this study the main objectives have been fulfilled:
1. Created student satisfaction model based on EPSI model.
2. Priority recommendations to increase the students’ satisfaction.

European Customer Satisfaction Index (ESCI)

The ECSI model was originated in 1998, when the ECSI Steering Committee prepared an initial structural equation model (Figure 1). (Martensen, Grønholdt, Eskildsen, & Kristensen, 1999) Described the ECSI model as “[...] structural equations model with unobservable latent variables [...] that link customer satisfaction to its determinants and, in turn, to its consequence, namely customer loyalty.”

For measuring Customer Satisfaction in a wider context, a structural equation model has been developed based on the components considered below. The components are viewed as latent variables determined by a set of manifest constructs for each component.
The boxes represent the latent variables and the arrows represent connections (impacts) between these latent variables in accordance to the devised representation of the economic process modelled. The currently agreed upon framework (with cause – effect links) is in Figure 2.
The model differs from the model used in the pilot study mainly in the respects that it includes multiple links between the enablers and the results’ dimensions. Slightly different models were also estimated for some countries depending on the needs and requirements of the country. As one example, complaints were explicitly modelled in a few countries for individual years (Eklöf, 2005).

Table 1

*Indicative score categories for customer satisfaction indicator*

*(EPSI Rating, 2008)*

<table>
<thead>
<tr>
<th>Index Value</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 55</td>
<td>Totally unacceptable</td>
</tr>
<tr>
<td>55 - 60</td>
<td>Very poor</td>
</tr>
<tr>
<td>60 - 65</td>
<td>Poor / Low</td>
</tr>
<tr>
<td>65 - 75</td>
<td>Medium / Average</td>
</tr>
<tr>
<td>75 - 80</td>
<td>Strong / Good</td>
</tr>
<tr>
<td>80 - 85</td>
<td>Very strong</td>
</tr>
<tr>
<td>85 - 100</td>
<td>Extra ordinary/ Unique</td>
</tr>
</tbody>
</table>

**Students’ Satisfaction Index Model**

According to (Chiandotto, Bini, & Bertaccini, 2006) expectations are reason for choosing specific subjects. Perceived Quality consists of perceived quality of hardware and perceived quality of humanware. Perceived quality of hardware is evaluation of classrooms, libraries, laboratories and canteen but perceived quality of humanware is the evaluation of relationship with professors, assistants, non-teaching staff, fellow students, and overall judgement. Value is satisfaction for coherence with studies and conformity with own cultural interests. Satisfaction is the satisfaction for acquired skills, and overall judgement. But loyalty is hypothesis of re-attendance, intention to continue studies and educational. (Martensen, Grønholdt, Eskildsen, & Kristensen, 1999). Considering the perceived value, it consists of two factors: (1) The value of the education in relation to one’s own effort; and (2) The value of the education in relation to coming job and career.

The same study (Martensen, Grønholdt, Eskildsen, & Kristensen, 1999) classified perceived quality into: (1) “Human ware” is called human elements: (1.1) Teaching (academic standard, pedagogical methods; and personal contact with teaching staff). (1.2) Personal contact with administrative staff. (2) “Hard ware” is called non-human elements: (2.1) Provided study programmes and courses; and (2.2) Support functions (classrooms, library, computer facilities, equipment, student office, etc.).

This study classified the perceived quality into hardware which is the recourses as the library, course materials, support facilities, laboratories, classrooms, organization and welfare. And software is the staff, academic support and administration. The study considered loyalty as the student’s feeling of a part or belonging to the education institute.
Methodology

Research Survey

The developed survey (table 3) in this study contains 46 manifest variables and 13 latent variables in Romanian language. The questions addressed about the importance to the student and the performance according to his point of view. The questions were answered on a Likert scale of 1-5 with 1 meaning “very low” and 5 meaning “very high” and 0 meaning “it’s not important” to the statement.

Data Collection Method

The survey was sent out automatically to the chosen respondents. The initial e-mail was sent out to postgraduate students then 2 reminders were sent out with 1.5 week interval. The response of Romanian students was less than the expected. Then hard copies were distributed by hand to her undergraduate students in the last year 2009/2010. The responses were from industrial engineering and computer science faculties.

Data Cleaning Process

SPSS statistical software was used to prepare the data and simplify it bivariate sample statistics were first computed. Six observed variables were removed because of low correlations with other items in the software dimension. Three observed variables were removed because of low correlations with other items in the hardware dimension. One observed variable was removed from the value as it low correlated with the other items and so one observed variable from the loyalty. Cronbach’s Alpha is more than 0.7 for all the items which means that the variables are reliable.

Creation of Structural Model

In this study SmartPLS (Partial Least Squares) is the software used to solve structural models. Mean replacement option for missing data treatment was used since case wise deletion throws away a lot of useful information and thus leads to lower efficiency (Temme, Kreis, & Hildebrandt, 2006).

The Analysis of Result

After several tries, the following student satisfaction model was obtained. Figure 3 shows the final PLS model, coefficient of determination ($R^2$) and impact score. Figure 4 shows t-values for loading factors and path coefficients. The $t$-values should be >1.69 with $p$-value<0.05 in order to show significance. This is a significant relationship between two variables with at least 95% certainty.
Figure 3. The Final PUB Model of student satisfaction

Figure 12. t-values for the PUB model
Model Validation

Table 2 shows the validation criteria of the final model. The reliability means the coherence, stability and dependability of the survey result. The Cronbach Alpha coefficient must achieve above 0.7 (Chin, 1998). The values of potential variable Cronbach Alpha were among 0.71-0.86, which indicates that the measurements to various potential variables present good inner coherence and the index reliability can be accepted.

Composite reliability is a preferred alternative to Cronbach's alpha as a measure of reliability because Cronbach's alpha may over- or under-estimate scale reliability. Underestimation is common. For this reason, composite reliability is now preferred and may lead to higher estimates of true reliability (Chin, 1998).

In an adequate model for exploratory purposes, composite reliabilities should be greater than .60 and greater than .70 for an adequate model for confirmatory purposes (Chin, 1998). The composite reliability values of total 6 latent variables in Table 2 were among 0.78-0.89, which shows that the inner coherence of the measurement model is high.

Effectiveness is the index whether the observation variable in the survey can better reflect the potential variable. The average variance extracted (AVE) of potential variable denotes the variance percentage that certain potential variable can explain the observation variable (Chin, 1998). The value of AVE is requested to exceed 0.5 (Linying, Zhijun, & Qun, 2008). From Table 2, the AVE values of various potential variables in the model were among 0.51-0.67.

R-square. This is the overall effect size measure, as in regression, indicating here that 68.9% of the satisfaction variable was explained by the model. No R-square is shown for socioeconomic status (SES) or incentives as these are exogenous latent factors. (Chin, 1998) Chin describes results above the cut-offs 0.67, 0.33 and 0.19 to be “substantial”, “moderate” and “weak” respectively. The R-square here should be considered to be of substantial strength or effect.

Table 2
Model’s Quality Criteria

<table>
<thead>
<tr>
<th></th>
<th>Ave.</th>
<th>Composite Reliability</th>
<th>R Square</th>
<th>Cronbach’s Alpha</th>
<th>Communality</th>
<th>Redundancy</th>
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<td>Expectations</td>
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<td>0.84</td>
<td>0.75</td>
<td>0.57</td>
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<td></td>
</tr>
<tr>
<td>Hardware</td>
<td>0.51</td>
<td>0.84</td>
<td>0.48</td>
<td>0.77</td>
<td>0.52</td>
<td>0.23</td>
</tr>
<tr>
<td>Software</td>
<td>0.51</td>
<td>0.89</td>
<td>0.75</td>
<td>0.86</td>
<td>0.51</td>
<td>0.21</td>
</tr>
<tr>
<td>Value</td>
<td>0.51</td>
<td>0.89</td>
<td>0.64</td>
<td>0.86</td>
<td>0.51</td>
<td>0.19</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>0.7</td>
<td>0.89</td>
<td>0.69</td>
<td>0.83</td>
<td>0.67</td>
<td>0.43</td>
</tr>
<tr>
<td>Loyalty</td>
<td>0.56</td>
<td>0.79</td>
<td>0.55</td>
<td>0.71</td>
<td>0.56</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Index Values for Latent Variables

The 95 percent confidence interval for the customer satisfaction index must have a width of not more than 4 units (referring to an index scale of 0 – 100) (EPSI Rating, 2008). These latent variables $V_l$ are normalized as follows: the original items $V_l$, scaled from 1 to 5, are transformed into new normalized variables $x = (V_l - 1) * (100/(v_l - 1))$. The minimum possible value of $x$ is
0 and its maximum possible value is equal to 100. The maximum value in likert scale is \( yl \) (Tenenhaus, Chatelin, & Esposito Vinzi, 2002).

As evident in table 3 the indices are all between 56 and 65, this is a minor variance. The total performance index for value, satisfaction and loyalty is estimated at 62, 65, and 56, respectively. The performance index appears equal for hardware and software (61) which is also the determinant with the weakest influence and the highest on satisfaction and loyalty. Expectations (63) achieve the highest performance index, and this is also the determinant with the medium impact on satisfaction and loyalty.

Table 3

<table>
<thead>
<tr>
<th>Index Values for Latent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Expectations</td>
</tr>
<tr>
<td>Hardware</td>
</tr>
<tr>
<td>Software</td>
</tr>
<tr>
<td>Value</td>
</tr>
<tr>
<td>Satisfaction</td>
</tr>
<tr>
<td>Loyalty</td>
</tr>
</tbody>
</table>

Priority Analysis

Impact matrix or priority map provides an overview of the factors’ importance to the student and their perceived performance at the current point in time. By using SWOT analysis PUB can identify where it should put their focus in order to increase student satisfaction and loyalty (Martensen & Gronholdt, 2003). This approach provides a well-arranged review of the target areas, but also the areas that need to be kept under supervision for future changes in impact or performance, which will become evident with this approach. The impact matrices are divided into four quadrants (Martensen & Gronholdt, 2003):

- **Threats**: The lower right quadrant. The variable scores low on performance and high on relative importance. This should be the primary priority area, since it is essential for student satisfaction & loyalty, but an area where PUB performs poorly. Focus should mainly be on improving the performance of the variables positioned in this area.

- **Strengths**: The upper right quadrant. The variable scores high on performance and high on relative importance. PUB is doing well in this area, which is important for student satisfaction & loyalty. The position of the variable should be kept under supervision and constantly adjusted, to make sure that negative changes are prevented.

- **Weaknesses**: The lower left quadrant. The variable scores low on performance and low on relative importance. The area should be a secondary priority area in relation to implementing changes that will maintain and increase student satisfaction & loyalty.

- **Opportunities**: The upper left quadrant. The variable scores high on performance and low on relative importance. PUB is doing well in this area, but the area does not have a large effect on satisfaction & loyalty. The area should be monitored and the performance level maintained or optimized. It should be pursued to move the variable into the strengths area.
We found that software affects satisfaction most profoundly: if this variable is improved by one point, the satisfaction index will rise by 0.72. This impact is calculated by adding the direct effect on satisfaction and the indirect effect via value. If we calculate all the direct and indirect effects of the other latent variables, it is revealed that the hardware will also make the satisfaction index rise by 0.442. Student satisfaction is thus created primarily via software and hardware.

Table 4

<table>
<thead>
<tr>
<th></th>
<th>Satisfaction</th>
<th>Loyalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectation</td>
<td>0.6654</td>
<td>0.5719</td>
</tr>
<tr>
<td>Hardware</td>
<td>0.4423</td>
<td>0.3893</td>
</tr>
<tr>
<td>Software</td>
<td>0.726</td>
<td>0.7056</td>
</tr>
</tbody>
</table>

The remarkable point here that expectation has no direct effect on satisfaction but has the highest total effect on it because it has a relatively high direct effect on software, hardware and value in the same time it has indirect effect on software and value. So if the expectation increases by 1 point that will cause an increase in the satisfaction index by 0.665.

Figure 5. Impact vs. Performance in driving Satisfaction
The high priority is for software as it is the threat quadrant in the two matrices with impacts on satisfaction and loyalty 0.726 and 0.705 with performance index 61. The second priority is for hardware, which lies in weakness quadrant with impact on satisfaction 0.4423 and on loyalty 0.389 with performance index 61. The third priority is for the variant in the strength quadrant, which must be maintained to be kept in strength and try to improve its performance index. Expectation has a performance index 63 and impact on satisfaction 0.6654 and on loyalty 0.57.

<table>
<thead>
<tr>
<th>Priority Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Priority</td>
</tr>
<tr>
<td>Satisfaction</td>
</tr>
<tr>
<td>Loyalty</td>
</tr>
</tbody>
</table>

Priority at Specific Level

After estimating the model and calculating the indices, a regression analysis of the relationships between the computed indices and their specific indicators were performed. Based on these results, the relative importance for each research question on its variable can be calculated and subsequently combined with the performance levels, hence creating a priority map for each driver.
The conceptual model had 46 manifest variables and if more was to be included, since the survey would be too long and immense. 11 manifest variables were removed from the drivers; hardware and software. But it is still possible to compute priority maps for these areas, since there is enough information to show the relative importance for each research question.

A priority map was created for software and ten research questions were presented in the map. However, Q5 “Staff have given a specialist insight into the subject”, Q6 “Staff have made the subject interesting” and Q7 “Staff are enthusiastic about what they are teaching” that represent the teaching in the degree. Q11 “Assessment arrangements and marking have been fair”, Q13 “I have received detailed comments on my work” and Q14 “Feedback has helped me to see how I could improve my work” that represent the assessment and feedback. Q21 “The degree is well-organised and running smoothly” and Q31 “The range and balance of approaches to teaching has helped me to learn” that represent the administrative side in the educational process.

Table 6
Impact and Performance Indices for Software Endogenous

<table>
<thead>
<tr>
<th>Manifest Variable</th>
<th>Impact</th>
<th>Performance Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q5</td>
<td>0.1494</td>
<td>83</td>
</tr>
<tr>
<td>Q6</td>
<td>0.1546</td>
<td>58</td>
</tr>
<tr>
<td>Q7</td>
<td>0.1518</td>
<td>56</td>
</tr>
<tr>
<td>Q11</td>
<td>0.1608</td>
<td>67</td>
</tr>
<tr>
<td>Q13</td>
<td>0.1271</td>
<td>52</td>
</tr>
<tr>
<td>Q14</td>
<td>0.1291</td>
<td>55</td>
</tr>
<tr>
<td>Q15</td>
<td>0.147</td>
<td>59</td>
</tr>
<tr>
<td>Q17</td>
<td>0.1269</td>
<td>56</td>
</tr>
<tr>
<td>Q21</td>
<td>0.1809</td>
<td>58</td>
</tr>
<tr>
<td>Q31</td>
<td>0.1583</td>
<td>63</td>
</tr>
</tbody>
</table>

A priority map is created for hardware and 5 research questions are presented in the map. However, Q19 “The timetable works efficiently as far as my studies are concerned”, Q22 “The library resources and services are good enough for my needs” and Q25 “I have been able to access specialised equipment, facilities or rooms when I needed to”, Q30 “Learning materials available on my course have enhanced my learning” and Q34 “Practical activities on my course have helped me to learn”.

Table 7
Impact and Performance Indices for Hardware Endogenous

<table>
<thead>
<tr>
<th>Manifest Variable</th>
<th>Impact</th>
<th>Performance Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q19</td>
<td>0.2814</td>
<td>56</td>
</tr>
<tr>
<td>Q22</td>
<td>0.2649</td>
<td>60</td>
</tr>
<tr>
<td>Q25</td>
<td>0.2096</td>
<td>51</td>
</tr>
<tr>
<td>Q30</td>
<td>0.3721</td>
<td>64</td>
</tr>
<tr>
<td>Q34</td>
<td>0.252</td>
<td>72</td>
</tr>
</tbody>
</table>
Improvement Areas

As a result of the operational perspective analysis there are four priorities for “Politehnica” University of Bucharest to improve its performance to increase the students’ satisfaction. Table 8 summaries those areas of improvement and arranging these priorities.

Table 8
Priorities of development

<table>
<thead>
<tr>
<th>First Priority</th>
<th>Second Priority</th>
<th>Third Priority</th>
<th>Fourth Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisation</td>
<td>Detailed Feedback</td>
<td>Practical Activities</td>
<td>Learning Materials</td>
</tr>
<tr>
<td>Library service</td>
<td>Academic support</td>
<td>Range and Course balancing</td>
<td></td>
</tr>
<tr>
<td>Classrooms and laboratories</td>
<td>Professors’ enthusiasm</td>
<td>Marking fairness</td>
<td></td>
</tr>
<tr>
<td>Technical facilities</td>
<td></td>
<td>Academic staff development</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

As the study has set out to assess student satisfaction at PUB, now we might provide detailed answers about the actual degree of this satisfaction. With the basis of the strategic context and presented theories and study’s results, too, some answers can be given.

Figure 13. Impact vs. Performance in driving Software
Figure 8. Impact vs. Performance in driving Hardware

Overall students’ expectations were fulfilled even it lies in the poor zone and the perceived value of PUB was ranked after also in the poor zone. Also, students indicated in the surveys to be satisfied with PUB by 65% this year and will continue to be loyal in their university by 56%.

The academic support level, the degree content, academic staff and organisation were the source of some concern in relation to student satisfaction at PUB. Although these attributes were still rated highly for the experienced quality, they could raise up to the students’ desired level of satisfaction.

The non human side of the education process has a direct impact on the gained value of career and personal development. And also has a direct impact on the human side in the process as it is the main tool of explaining the course.

The human side has a high effect on the student’s loyalty to PUB as he spends four years inside the university.

PUB needs some severe reformations especially in the Organisation and management area on the human and non human levels. The second area to be improved is academic support, but also the improving of the organisation category will be reflected directly on this area. Even the academic staffs are highly qualified but they have no enthusiasm about what they teach or make the subject interest. This may be the direct result of the employment conditions and low level of salaries comparing to the European level of academic staff wedges. It is definitely important to give material motivation to the academic staff in order to be reflected directly on the students’ personal development and satisfaction. Learning resources as classrooms, laboratories, IT resources and libraries must be easily accessed by the students to help them in the educational programmes. But this area of improvement needs a lot of financial support. Thus, another study must be done in detail in order to analyse the impact of each element in the learning resources category.
References


The Tacit Dimension in Engineering and Technical Management Education: Some Theoretical Considerations

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New York – U.S.A.

Abstract

How is innovation fostered? Are traditional engineering and management curricula conducive to innovative thinking? Do approaches such as the Theory of Inventive Problem Solving (TRIZ) (Altshuller, n.d.), adopted by the Research and Development departments in industry, create procedures and best practices that lead to innovation and support entrepreneurial activity? There is indication that they do not. Both in engineering schools or polytechnics and business schools educational reforms are underway in an effort to foster innovation. This discussion will raise fundamental questions concerning the theoretical basis for teaching or provoking innovative thinking in the context of engineering and technical management education. The focus here will be on what Michael Polanyi and others have called the tacit dimension. If one begins with the observation that we often know more than we can say, and include in such knowledge more than technique and motor skills, then we acknowledge the importance of the tacit dimension of knowledge and understanding. Does the tacit dimension of knowledge explain the kind of creativity associated with scientific discovery and innovative thinking? This discussion will consider the tacit dimension on three levels: (1) tacit knowledge; (2) emergence; and (3) collaborative exploration of new ideas. On each of these levels the context of discovery is emphasized.

Keywords: Education, engineering, tacit knowledge, technical management education
Background

Let us begin with a caricature of the engineering student’s intellectual proclivities. Despite engineering’s foundation in science and mathematics engineering students do not think like theoretical scientists or mathematicians. Likewise although engineering has roots in craft upcoming engineers in the digital age are more inclined to think in I/O models than extended narrations. Finally as world makers and maintainers engineers are intimately involved in matters of human choice and preference yet engineering students do not focus on questions of social psychology, aesthetics and value. Of course this caricature is refuted by numerous exceptions, and the more so as engineers grow in their profession, but it does point to an intellectual trait common to many who are attracted to study engineering. Rather than see this set of dispositions negatively, as something to be overcome by education, consider the virtues of this outlook and in particular the strengths it brings to contexts of problem solving, discovery, innovation and invention.

Since what these activities have in common is the quest for something new I will focus on discovery. How do discoveries happen? Can one plan to make a discovery or are they always accidents and serendipities? What sort of sagacity is open to discovery? To the latter question the answer is surely “no.” Hume’s (1910) famous demonstration of the limitations of inductive prediction, showing that ordinary observation establishes the expectation of the uniformity of nature into the future but not its guarantee and that our knowledge of causation is only habitual opens the door for a critique of science based upon a principle of certainty. If discovery is not a matter of strict adherence to scientific protocols then what is its context?

History tells of numerous discoveries, scientific included, that were pure accident or a result not at all predicted by the investigation. In The Logic of Scientific Discovery, Popper (1992) develops the standard for empirical research known as “falsifiability.” The criterion of falsifiability in contrast to verification or confirmation is based upon the recognition that one can almost always find evidence in support of what one already believes. Yet the principle of falsification does not imply a new method for investigation beyond a protection against the affirmation of inadequate certification of dubious discovery. In a sense the procedure developed by Popper was an empiricist’s way of holding onto the Cartesian standard that gave birth to the new science in the era of Copernicus. In his famous Meditations on First Philosophy, DesCartes (1639) argued that anything validated simply by the senses might be no more than a figment of the imagination and that even the results of careful rational and mathematical deliberation could be false insofar as they might simply be the extension of axiomatic principles which themselves lacked a guarantee. The results of empirical and rational investigation alike were, without such a guarantee, doubtful. DesCartes ultimately found his guarantee in God, thus tying science to a metaphysical system in which the source of certainty rested upon the validity of the ontological argument. From either standpoint the canonical principles of science are instilled with a caution, order and even orthodoxy resistant to radical innovation. To put it another way, scientific revolution – that outpouring of new thinking and discovery – is an aberration or overcoming of science, the throwing out of an established set of principles in favor of a new promise. As purveyors of the new, engineers must sustain a tense relationship with science, at once exploiting and eschewing it.

This applies to engineers as discoverers but here engineering is a house divided upon itself. Engineering is characterized by four fairly distinct activities described frequently as CDIO – Conceive, Design, Implement and Operate. Conception, i.e., discovery, differs generically from the other components of engineering. It is with conception that engineering runs afoul of the scientifically biased methods of traditional engineering education.

Perhaps it is a trifle to assert that engineers harbor little interest in the concerns of epistemology and metaphysics, although perhaps it is the case that in its non-discoverer role the quality of engineering practice is proportional to its epistemological rigor. But the larger point is that scientific methodology on
the level of justification does not describe the process of discovery and indeed may be incommensurate with that process.

Yet surely discovery is not pure serendipity. It happens in the context of purposeful inquiry, disciplined observation and open receptivity. How can those conditions be fostered in an atmosphere where scientific knowledge is abundant and scientific methodologies fluent?

Discussion

Tacit Knowledge

The online Business Dictionary (n.d.) offers this standard definition:

“Unwritten, unspoken, and hidden vast storehouse of knowledge held by practically every normal human being, based on his or her emotions, experiences, insights, intuition, observations and internalized information. Tacit knowledge is integral to the entirety of a person’s consciousness, is acquired largely through association with other people, and requires joint or shared activities to be imparted from one to another. Like the submerged part of an iceberg it constitutes the bulk of what one knows, and forms the underlying framework that makes explicit knowledge possible.”

Put this way no one can doubt the significance of tacit knowledge nor fail to recognize it as fundamentally social. It would include much more than scientific knowledge as much tacit knowledge would fail to meet any epistemic criteria. It would be hard to differentiate between opinions and beliefs on the one hand, and genuine knowledge on the other. Within the framework of tacit knowledge beliefs and actions could be justified by almost any kind of assent or approval. One can imagine an extreme case:

Craftsmen work in a shop making acclaimed violins using a set of tools passed down from generation to generation. The materials used to make the violins are the same, the wood coming from the same forests, etc. Similarly for generations the craftsmen all began as apprentices and were trained in their art exclusively by the masters in the shop. The question would rarely if ever arise as to whether a specific technique is the best; one would simply carry on in the tradition doing things in the same way with the same tools as has always been done. In this context one would know how to do something even though it might be quite difficult to explain how to do it. The transmission of knowledge from master to apprentice would require little explicit articulation and certainly there would be no need for an apprentice to ask the master why a given method was the best way to do something.

One can make several observations on this scenario.

• The knowledge of how to do something has been internalized but the reason why it should be done in such and such a way is not an issue.
• Critical evaluation is not encouraged; quality is correlated with consistency.
• The transmission of such how-to knowledge is completely social and for that reason fragile; although one could record some of it (e.g., the recipe for the glue) such a record would not and could not be complete.
• This truth is anecdotal and subjective. Many beliefs could be internalized which could not be verified or confirmed externally. Standards would be entirely internal.

The fundamental questions left by this scenario are:
1. Specifically what is lost when technology practice is governed exclusively by the transmission of tacit knowledge?
2. How can tacit knowledge be acknowledged and transmitted in the context of modern engineering and technology management?
Is this environment a context for discovery? In his classic short book, *The Tacit Dimension*, chemist turned philosopher Polanyi (1966) argues for the rebuttal of exactitude as the ideal of science in order to open the horizons of scientific investigation and to enable the exploration of areas otherwise closed to the scientific mind. In the imagined example above processes are governed by tacit knowledge, yet the conservative goal of replicating the most perfect violin from past production is not open the exploration of alternative ideals. How does Polanyi understand tacit knowledge to broaden horizons and encourage exploration?

He begins by recalling the suppression of pure science under Stalin and the ironic fact that socialist-communist theory proclaimed scientific justification. Stalin may have understood that scientific revolutions could threaten the enforced “revolutionary consciousness” imposed under Soviet rule. Whatever the case Polanyi in a manner similar to Popper saw how a kind of scientific certainty produced dogmatic ideologies. Is there a mode of scientific inquiry that avoids the tyrannical potential of science grounded in a Cartesian-like epistemology of certainty but at the same time does not descend into the closed domain of intuitive understanding where tradition and local approval rule out other modes of empirical confirmation? Would such a mode of inquiry lend itself to discovery? It is Polanyi’s position that proper acknowledgement of the tacit dimension does just that.

**Emergence**

In physics emergent properties of compound substances are those that cannot be predicted from even the most complete analysis of the physical features of the constituent elements. For example, based upon an analysis of the properties of oxygen and hydrogen it is possible to predict that they will under suitable conditions combine to form $\text{H}_2\text{O}$, but it is not possible to predict that it will be wet. Wet is an emergent property discovered in some way that eludes analysis. The discovery of emergent properties, therefore, amounts to realizing when they appear that they are important. This kind of realization is an act of the imagination. Consider the environment of a modern engineering research laboratory. The experiments, tests and investigations are exercises, based upon scientific knowledge, that seek to confirm a hypothesis. Actually, in many cases what is formally called a hypothesis may be little more than a hunch based upon the investigator’s experience working with similar devices or materials. In other words, the basis of the hypothesis is largely a matter of tacit knowledge. In this scenario the use of scientific methods is not abandoned; indeed the appreciation of the potential significance of the emergent property takes place and could only take place in the context of a rigorous scientific inquiry.

The history of science offers an interesting example which can be applied to the question at hand. What we now know as the Copernican revolution, the move in the science of astronomy from a conception of a closed world with the earth as its crowning glory located in the very center to that of an infinite and open universe where the position of the earth was not special, required both very careful, rigorous and precise measurement and recording of data and the freedom of mind to shift completely the theoretical paradigm (Koyré, 1957). It is this latter freedom of mind that emerges from shared experience and reflection, not bound by fidelity to what must be according to the theoretical presuppositions. In the case of the Copernican revolution what was overthrown were metaphysical and epistemological doctrines. Yet there are many ordinary examples where strict allegiance to procedure or precedent blinds one to what may be before his/her eyes. Let us consider again our earlier scenario.

In the shop of the violin master craftsman the enforced discipline was not scientific, indeed scientific knowledge was deemed unnecessary, but rather tacit knowledge crystallized from the past. Indeed the tacit knowledge that regulated the workshop’s procedures and assured the standard of excellence was not really shared as tacit knowledge but was more of a doctrine, passed down and kept as proprietary or private knowledge within the firm. The apprentice craftsmen were told to imitate their masters with the justification that only in this way would the best result be guaranteed. Thus it is obvious that a dogmatic point of view would effectively inhibit discovery and innovation. On the one hand the
workshop exhibited exemplary engineering and managerial standards, the kind of standards essential to quality control. At the same time, however, these very standards stifled creativity and undermined the possibility of discovery.

**Open Tacit Knowledge**

The definition of tacit knowledge should be expanded to include openness and critical reflection. The transmission of practical and experiential knowledge cannot be permitted to atrophy into dogma. It is obvious that when information is passed on in a rote manner, without the emotional and critical intellectual interiorization of it not only does it work to close one’s mind and heart, it also promotes error. Consider the popular party game where individuals pass a secret message from one to another each whispering to the next person in line. The message as spoken by the first person is ultimately compared with what the last person in the line heard. Inevitably the secret as received at the end of the line is an extraordinary distortion of the original. If the participants in the game had, upon hearing the secret, responded not by simply passing along what they had heard, but by questioning with heart and mind whether the report made sense. And when it did not, respond by initiating an open and shared examination, thus either discovering the remarkable or correcting the mundane. In this case we see that scientific inquiry and the tacit dimension have a common enemy: private or solitary knowledge.

**Collaborative Exploration of New Ideas**

Even when many hold precisely the same view and even repeat it to each other the knowledge may nonetheless actually be private or solitary. It is only when the discursive exchange of ideas takes place that openness is attained. How can such openness be achieved? The problem, of course, is that open discourse is often random, unstructured and imprecise. False opinion may not be challenged but allowed to exist in the open forum. Such a situation would be anathema in the engineering classroom. The alternative and what is normative, the rote repetition of memorized information tends to replicate the scenario of limited tacit knowledge, i.e., private knowledge passed on from master to apprentice. The fact that it is presented in abstract terms, through textbooks and other modes of documentation and derives its authority to a large extent from science is perhaps mostly a difference of appearance. It is hardly an example of open collaborative discourse.

What is needed to achieve the necessary critical response grounded in both cognitive analysis and experience, scientific and tacit knowledge, is an instructional method that provokes the individual testing of each new idea. Learning in such a way would emulate the natural learning of childhood, the way one learns to ride a bicycle for example. When learning is accomplished in this manner the knowledge is internalized and its efficacy is understood as an item of articulate information and in a natural and automatic way. The latter may be shared within a group setting and passed on intuitively. But it is neither private nor mysterious because the articulate dimension is always at hand. Both dimensions, the tacit and the articulate, coexist and reinforce each other. The educational task is to correlate these two levels or components of understanding.

The modern classroom is not the most conducive atmosphere for this type of integrated learning. For many the first experience in a classroom was the lesson that one should leave one’s experiential learning at the door. This is often formalized in teaching such subjects as logic where the instructor demonstrates that one’s intuitive grasp of what is correct or valid is actually fallacious. Too often the student of logic learns to demonstrate that a series of propositions leads to a false or invalid conclusion without ever feeling that the conclusion is false. Such circumstances were satirized by writers like Voltaire who portray situations where the obvious and common sense conclusion contradicts the logically established proposition. When the validity of a logical argument cannot be felt one might either abandon logic altogether as a useless or inappropriate tool or conversely make a leap of faith to accept logic while
abandoning common sense. The danger of such false existential choices is prevalent in the engineering classroom. The either/or of going with your “gut reaction” versus following the established rational path often leads either to unjustified knowledge or blindness to unexpected properties. Actually both alternatives represent a kind of blindness.

What approach can be taken to overcome this unfortunate dichotomy? Practical strategies need to replace the authority of the instructor with the genuine authority of justified knowledge. The justification of knowledge is acquired through the testing of propositions in situations that promote or lead to an intuitive grasp. The electrical engineering student should not simply be told Kirchhoff’s equations but made to work them out in a manner that demonstrates their efficacy. Circuit simulators can provide the “aha” experience of discovery. Of course the economy of time demanded by a modern course of study precludes the natural process of discovery in most cases. So situations need to be established which efficiently imitate the natural process. Simulators and collaborative or team work together can create the environment of open discourse to accord a tacit dimension to scientifically justified knowledge.

The specific pedagogical devices useful for achieving this double dimension of knowledge will vary by discipline. The case study approach of management can be adopted to ensure that opportunities are recognized. For example, circuit simulators allow electrical engineers to achieve an intuitive appreciation of abstract and formal principles, building and flying paper airplanes can lead to the kinesthetic appreciation of the forces of lift, drag, etc. The pedagogical techniques may be quite different but in the end the teaching of engineering, science, and management works in a way not unlike the teaching of poetry. It is a matter of coaching where telling has only limited utility. This is not a new lesson. The ancient Greek philosopher Socrates showed us this in numerous contexts ranging from questions of virtue to mathematics. Our task in a sense is to appropriate the Socratic method, often used in law schools, for use in the context of technical education.

Conclusion

Knowledge has been characterized as having two dimensions, the explicit or articulate and the tacit. Adequate understanding requires both and the possibility of discovery and innovation is improved greatly when both are present. Formal instruction in technical subjects often does not include the latter. The reasons for this are substantial resting on scientific and logical grounds as well as having a pragmatic basis of time constraint. However, the bifurcation of knowledge is disabling and can produce a tyranny of the old. Open collaborative discourse and experiential simulation can be managed in the modern classroom and these pedagogical devices can lead to integrated knowledge on both the explicit and tacit levels.

References

Gendered Entrepreneurial Attitudes: Some Evidence from the United Arab Emirates

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Abstract

In recent years, the issue of gender as it relates to entrepreneurship intentions and attitudes has gained unprecedented momentum. For a number of socioeconomic reasons, both academic and government sponsored research have been giving this topic increased interest. While some studies purport and argue that males, in general, tend to exhibit more pronounced entrepreneurial attitudes, other studies militate for no differences, however, very few of these studies have been conducted in non-western countries, particularly in the Middle East, including the Gulf region. To contribute to the current state of knowledge and research findings, this paper examines gender-difference in attitudes towards entrepreneurship. Ten dimensions of entrepreneurial attitudes were drawn from the literature and examined across gender groups. Cross tabulation and Chi square tests were performed to tease out potential differences. The results strongly suggest that the differences were not uniform and depended highly on the nature of the type of attitudinal dimension being considered. However, no significant differences were found with regard to the other entrepreneurial dimensions such as growth orientation, innovativeness, risk tolerance, openness to experience, competitiveness, managing money and being a leader. The paper discusses the meaning and implications of these results as well as their contextual relevance.

Keywords: Gender, entrepreneurship, entrepreneurial attitudes, creativity, United Arab Emirates
Background

Gender differences in entrepreneurship successes, attitudes and behavior have become a focal interest by government sponsored research initiatives (OECD, 2004; Kepler & Shane 2007); as well as in academic research (Wilson et al, 2007; Harris & Gibson, 2008; Shinnar et al, 2009). The increasing interest in gender-related entrepreneurship research has been underpinned by socio-economic rationale and the rapid increase in female participation world-wide (Nabi & Holden, 2008). Since the student populations are significant contributors to socio-economic activities and employment, it makes sense to examine their attitudes and intentions to participate in economic initiatives. This includes their attitudes and predisposition towards entrepreneurship. In that perspective, and because of the emergence of the role of women in the economy, comparisons of entrepreneurial attitudes across gender groups have gained momentum. Yet, despite much research, gender differences remain inconclusive. Also, very few studies have sought to verify such differences in the Middle East context (Bruton et al 2008). This paper aims to fill this gap by exploring entrepreneurial attitudes amongst business students in a United Arab Emirates (UAE) University. In particular, this paper focuses on comparisons between male and female students in relation to a number of entrepreneurial characteristics and attitudes.

Discussion

Entrepreneurial Attitudes

The decision of new venture creation largely depend on the entrepreneur’s attitude toward managing risk, work, independence and income (Douglas & Shepherd, 2002). Researchers have discussed a range of entrepreneurial attitudes which is the driving force behind entrepreneurial success. Generally entrepreneurs are high achievers and exhibit more positive attitude toward continuous improvement and are resilient in difficult situations (Lee & Chan, 1998). Aspiring entrepreneurial individuals are more likely to identify potential business opportunities (Shane, 2007). Entrepreneurs’ creativity plays an instrumental role in recognizing a potential business opportunity (Walton, 2003; Ward 2004). Successful entrepreneurs always seek new opportunities and work in a collaborative way. With high energy level, entrepreneurs remain optimistic in difficult situations (Ang & Chang, 2004). Entrepreneurs also believe in themselves, have internal locus of control (Longenecker et al., 1998), and high tolerance for ambiguity (Cheung & Chow, 2006). Benzing et al. (2009) asserted that certain skills are important in entrepreneurial success such as ability to manage people and finances. Entrepreneurs’ ability to effectively manage finances is considered a critical factor for entrepreneurial success (Kozan et al. 2006; Hatala, 2005). Entrepreneurs also show propensity to innovate and take risks (Frese et al. 2002). It has been established in the literature that entrepreneurs take moderate approach toward managing risk (Hui et al. 2006). Innovativeness refers to an entrepreneur’s ability to “produce solutions to new situations” (Littunen, 2000). Entrepreneurs’ ability to innovate plays a crucial role in entrepreneurial success (Casson, 1982).

Entrepreneurs need to work hard given the fact that significant time and effort is required to manage an entrepreneurial venture. The study conducted by Henderson and Robertson (2000) revealed that successful entrepreneurs are perceived as hard-working, motivated, and determined. Similarly, Scott and Twomey (1988) also found that aspiring entrepreneurs rate themselves higher in terms of their capacity for hard work and ability to innovate. The desire of young people to compete and win may drive them to start their own venture. Therefore, a favorable attitude toward competitiveness is positively related to entrepreneurial motivation (Autio et al., 1997). Further, according to “Leadership School of Thought on Entrepreneurship” (Cunningham & Lischeron, 1991), entrepreneurs should possess leadership qualities as they need to motivate, lead and direct their employees. It is imperative that entrepreneurs develop a team of reliable and effective people in order to achieve venture objectives.
Successful entrepreneurs develop a vision and encourage other people to transform that vision into reality (Cunningham & Lischeron, 1991).

**Gender and Entrepreneurship**

Entrepreneurship research on gender is becoming a promising stream as many authors are increasingly interested in investigating the gender differences in entrepreneurship attitudes. Many researchers have found that males are more entrepreneurial in nature in comparison to females (Gupta et al. 2008). The study conducted by Minniti et al (2005) revealed that male’s propensity to engage in setting up new business is almost double in comparison to females. Though the majority of studies report male dominance (Kolvereid, 1997; Kourilsky & Walstad, 1998; Wilson et al, 2007; Harris & Gibson, 2008), some studies have also revealed insignificant gender differences (Hatten & Ruhland, 1995; Jones et al, 2008; Shinnar et al., 2009).

Gupta et al (2008) pointed toward stereotypical behavior which associates entrepreneurial success with male gender. This could potentially discourage females pursuing entrepreneurial careers. It is important to appreciate that females are equally capable to achieve entrepreneurial success. Due to environmental constraints and stereotypical connotation, females are less likely to select self-employment as career (Betz & Hackett 1981; Brooks, 1988). Some stereotypical perceptions about females include lack of confidence in females (Bandura, 1992) and perceived lack of skills (Chen et al., 1998). Given all these assertions of framing entrepreneurship as male gendered concept, literature has revealed inconsistent results as some studies also find that females are equally entrepreneurial as male counterparts.

Perceptions with regard to gender related differences could potentially change in different cultural contexts (van Gelderen et al., 2008). Therefore a cross-cultural view of entrepreneurial behavior can improve our understanding of gender differences in entrepreneurial success. The present study aims to enhance the understanding of different patterns of entrepreneurial attitudes in the Gulf Cooperation Council (GCC) country like the United Arab Emirates.

**Students’ Entrepreneurial Attitudes**

Young entrepreneurs particularly students are increasingly interested in setting up new ventures. However, gender related studies are also abundant in context of students’ entrepreneurial attitudes. Recent literature reports a surge in number of students selecting self-employment as a career choice (Robertson & Wilkinson, 2006; Harding, 2007; Holden et al. 2007). Given that young entrepreneurs can play a significant role in economic development, various global initiatives aim to nurture the potential of young entrepreneurs (Nabi & Holden, 2008). In this context, various educational programs also focus on improving students’ understanding of entrepreneurship (Florin et al, 2007). Due to increased interest in academia, industry and government, youth entrepreneurship is at the forefront of entrepreneurship research.

Some authors have explored the impact of entrepreneurship education on students’ entrepreneurial attitudes. The study conducted by Henderson and Robertson (2000) revealed that students taking entrepreneurship related courses are more likely to start new venture in comparison to students who did not take courses related to entrepreneurship. Many authors have attempted to reveal the gender differences in the students’ entrepreneurial attitudes and found higher entrepreneurial propensity in male students in comparison to female students (Shay & Terjensen, 2005; Wilson et al, 2004). The study of 216 undergraduate students conducted by Harris and Gibson (2008) also confirms this assertion and found that female students show lower entrepreneurial orientation in comparison to the male students. Kolvereid (1997) studied the employment choice of 128 undergraduate students and found that male students show higher preference for self-employment in comparison to female students. In a study of
middle/high school students, Wilson et al. (2007) also revealed that male students have higher self-efficacy and entrepreneurial intentions in comparison to female students.

Given the fact that entrepreneurship studies are generally focused on developed countries such as the USA (Wilson et al., 2007; Shinnar et al., 2009; Scherer et al., 1990; Harris & Gibson, 2008; Gupta et al., 2008) and UK (Hussain et al., 2008; Henderson & Robertson, 2000), our understanding of patterns of students’ entrepreneurial attitudes in a rapidly emerging economy remains limited. Consequently, many authors have suggested that patterns of entrepreneurial attitudes should be explored in different cultural contexts (van Gelderen et al. 2008; Nabi and Holden, 2008; Bruton et al., 2008). The present study tries to fill this gap by examining patterns of students’ entrepreneurial attitudes in the GCC country such as the United Arab Emirates.

The literature revealed inconsistent results with regard to gender differences in entrepreneurial attitudes. Some studies report that male have higher propensity to start entrepreneurial ventures whereas some authors have revealed insignificant gender differences. Our study contributes to this ongoing debate on gendered differences in entrepreneurial attitudes.

The extant literature revealed that many studies have sought to explore the relationship between gender and entrepreneurial attitudes. Ten dimensions of entrepreneurial attitudes were drawn from the literature (RUPARI Center for Rural Entrepreneurship 2003 & Wilson et al., 2007). The exploratory relationships between gender and selected dimensions of entrepreneurial attitudes are shown in Figure 1 which underpins the theoretical framework of the study.

*Figure 1: Exploratory Relationships between Gender and Entrepreneurial Attitudes*

![Dimensions of Entrepreneurial Attitudes](image)

**Dimensions of Entrepreneurial Attitudes**
- Anticipating Opportunities
- Growth Orientation
- Creativity
- Innovativeness
- Hardworking
- Risk Tolerance
- Openness to Learning
- Competitiveness
- Managing Money
- Being a Leader

**Methodology**

The research concentrates primarily on survey data targeting cross-section of students in the college of business administration at the University of Sharjah, UAE. The primary data collection instrument used is questionnaire type. The clarity of different questions was ensured with the help of questionnaire pilot. The survey questionnaires were distributed to 305 students in both male and female campuses in the college of business. It was a representative sample from a cross-section of disciplines. A standard protocol for questionnaire distribution was observed by the class instructors and survey
facilitators before the distribution of questionnaires. The survey facilitators were required to read out certain statements to the survey participants highlighting the objective of the survey, ensuring respondents’ confidentiality, time required to complete the survey, and students’ voluntary participation in the survey. The class instructors were requested to distribute the questionnaires during class hours, while the survey facilitators (i.e. the researchers) personally collected the completed questionnaires. The classes were selected randomly encompassing the discipline areas taught within the college of business. In addition to distributing questionnaires during class hours, the survey facilitators also selected the students outside the classrooms on random basis and asked them to fill out the questionnaires. As the researchers personally administered the survey, a total of 305 useable questionnaires were collected.

Participants

The respondents include 63% female students and 37% male students. The higher proportion of female students represents the total population of students, (as the total number of registered female students is higher than male students in the selected institution). The age group of the majority of the respondents is between 18-22 years. 58% respondents were UAE nationals and 34% had outside GCC nationalities. Students of all levels, freshman through senior, were included in the study. Majority of the respondents pursued business administration degree. Over 35% of the students pursued business administration degree, followed by accounting (21%), MIS (20%), and public administration (9.5%). Approximately half of the respondents had GPA score between 2.0-3.0

Measures

The survey was aimed at gauging students’ entrepreneurial attitudes. In order to explore the students’ entrepreneurial attitudes, the scale constructs were adapted from the RUPRI Center for Rural Entrepreneurship (2003) and Wilson et al. (2007). The survey instrument contained the following 10 statements on different aspects of entrepreneurial attitudes.

1) Anticipating Opportunities: I am constantly seeing or building opportunities or ideas that have potential commercial value
2) Growth Orientation: I like to build or grow a business or take ideas and make something of them
3) Creativity: I am creative and I am regularly coming up with new ideas on how to do things better or more effectively
4) Innovativeness: I am innovative and I am able to find solutions to challenges and problems
5) Hard Working: I am a hard working person and I do what it takes to succeed
6) Risk Tolerance: I tolerate taking risk and I feel confident that I can successfully manage risk associated with creating and growing a business
7) Openness to Learning: I enjoy learning and am constantly seeking out new information that can help me in my daily life
8) Competitiveness: I am competitive and enjoy social/business activities that require me to compete with others
9) Managing money: I am good at managing money
10) Being a leader: I believe I have good leadership skills and can be an effective leader

The respondents were asked to indicate their levels of agreement with the statements on a five-point scale: strongly disagree, disagree somewhat, neither agree nor disagree, agree somewhat, and agree strongly.
Results and Discussion

For the ten questionnaire items, cross-tabulation was performed to examine the gender differences. Chi-Square test was used to determine the significance of gender differences. As shown in Table 1, significant gender differences were revealed in terms of anticipating opportunities, creativity, and hardworking. About 22 percent of male students strongly agree that they build opportunities or ideas that have potential commercial value in comparison to 13 percent female students. About 5 percent of female students strongly disagree that they build opportunities or ideas that have potential commercial value in comparison to zero percentage in case of male students.

Table 1
Entrepreneurial Attitudes: Significant Gender Differences

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<tr>
<td>Anticipate Opportunities</td>
<td>0%</td>
<td>6.4%</td>
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<td>21.8%</td>
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Though male students scored higher in terms of anticipating opportunities, female students scored higher in terms of creativity and hardworking. Around 44 percent of female students strongly believed that they are willing to do what it takes to succeed. In comparison, 29 percent of male students strongly agree to the statement that they consider themselves hardworking and do what it takes to succeed. Around 50 percent of female students somewhat agreed that they are creative and regularly come up with new ideas in comparison to 37 percent of male students. Chi-square test was conducted to reveal the significance of gender differences. The results of Chi-square tests are presented in Table 2 which shows significant gender differences in terms of anticipating opportunities, creativity, and hard work. According to Ward (2004), creativity can play an instrumental role in entrepreneurial success. Successful entrepreneurs are also perceived as hardworking (Henderson and Robertson, 2000). As female students did not score less on these entrepreneurial dimensions, our findings underpin the assertion that females are not less entrepreneurial in nature as compared to male entrepreneurs (Hatten & Ruhland, 1995; Jones, et al., 2008; Shinnar et al., 2009).
Table 2

| Chi-Square Test Results – Significant Gender Differences |
|---------------------------------|----|-----|
| Value                           | df | Sig. |
| Anticipate Opportunities        | 10.716 | 4 | 0.03 |
| Creativity                      | 9.56 | 4 | 0.049 |
| Hardworking                     | 11.699 | 4 | 0.02 |

Out of ten scale items, seven items did not reveal significant gender differences. These items include: growth orientation, innovativeness, risk tolerance, openness to learning, competitiveness, managing money, and being a leader. As shown in Table 3, about 52 percent male students strongly agree that they try to build or grow a business or take ideas and make something of them. On the other hand, 41.3 percent female students also strongly believe to have growth orientation. With regard to innovativeness, around 76 percent male students somewhat/strongly believe that they are innovative and are able to find solutions to challenges and problems. An equal number of female students (76 percent) somewhat/strongly agree that they are innovative. Similarly, with regard to risk tolerance, around 27 percent male students strongly believe that they tolerate taking risk and feel confident that they can successfully manage risk associated with creating and growing a business. With regard to female students, 23 percent strongly believe in their ability to take the necessary risk to start an entrepreneurial venture. Both male and female students were also not significantly different in terms of openness to learning. About 36 percent male and 43 percent female students strongly believe that they enjoy learning and are constantly seeking out new information that can help them in daily life. Gender difference was also not significant with regard to competitiveness. In case of male students, around 32 percent strongly believe that they are competitive and enjoy social/business activities that require them to compete with others. On the other hand, 35 percent female students also strongly believe that they are competitive. No significant differences were revealed in terms of managing money and being a leader. Around 34 percent male and 30 percent female students strongly believe that they are good at managing money. Further, around 39 percent male and 33 percent female students strongly believe that they have leadership skills and can be effective leaders.

Chi-square test was conducted to reveal the significance of gender differences with regard to above mentioned seven scale items. The results of Chi-square tests are presented in Table 4 showing insignificant gender differences in terms of growth orientation, innovativeness, risk tolerance, openness to learning, competitiveness, managing money and being a leader. These findings are consistent with prior studies which also purport no significant gender differences in entrepreneurial attitudes (Jones, et al., 2008; Shinnar et al., 2009). Successful entrepreneurs have growth orientation (Lee & Chan, 1998), and tend to be innovative in finding solutions to challenging problems (Casson, 1882), show propensity to take risks (Frese et al., 2002), exhibit positive attitude toward continuous improvement and learning (Lee and Chan, 1998), like to compete (Autio et al. 1997), are good at managing money (Kozan et al. 2006), and motivate people for achieving organizational objectives (Cunningham & Lischeron, 1991). Though prior studies also revealed male dominance in terms of different entrepreneurial attitudes (Wilson et al, 2007; Harris & Gibson, 2008), there is a need to appreciate equal potential of females as they are also capable to exhibit above mentioned entrepreneurial attitudes similar to male counterparts.

Conclusions

Despite renewed interest in gender related entrepreneurship studies, the focus remains on the developed regions and our understanding of patterns of entrepreneurial attitudes in other settings remains
limited. Given the fact that there is paucity of entrepreneurship research in the GCC region, our study has two important contributions: First it contributes to the ongoing debate which focuses on teasing out the gender differences in students’ entrepreneurial attitudes. Second, present study, for the first time, explores the patterns of students’ entrepreneurial attitudes in the GCC region country like the UAE.

The results of seven out of ten scale items are inconsistent with previous studies conducted by (Kolvereid, 1997; Kourilsky & Walstad, 1998; Wilson et al., 2007; Harris and Gibson, 2008). Both male and female students were not significantly different in terms of growth orientation, innovativeness, risk tolerance, openness to experience, competitiveness, managing money and being a leader. These findings are consistent with prior studies (Hatten & Ruhland, 1995; Jones et al, 2008; Shinnar et al., 2009). However, in comparison to male students, female students scored higher in terms of creativity and hard work. These findings underpin gender differences but are inconsistent with previous studies which purport male dominance in entrepreneurial attitudes (Wilson et al., 2007; Harris & Gibson, 2008).

Table 3
Entrepreneurial Attitudes: Insignificant Gender Differences

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<td>Count (Male)</td>
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<td>Count (Male)</td>
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<td>18</td>
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<td>% within Gender</td>
<td>2.7%</td>
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<td>Count (Female)</td>
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<td>Count (Female)</td>
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<td>% within Gender</td>
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<td><strong>Being a Leader</strong></td>
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<tr>
<td>% within Gender</td>
<td>4.5%</td>
<td>1.8%</td>
<td>19.1%</td>
<td>35.5%</td>
<td>39.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Count (Female)</td>
<td>4</td>
<td>16</td>
<td>39</td>
<td>69</td>
<td>63</td>
<td>191</td>
</tr>
<tr>
<td>% within Gender</td>
<td>2.1%</td>
<td>8.4%</td>
<td>20.4%</td>
<td>36.1%</td>
<td>33.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Table 4
Chi-Square Test Results – Insignificant Gender Differences

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth Orientation</td>
<td>3.73</td>
<td>4</td>
<td>0.444</td>
</tr>
<tr>
<td>Innovativeness</td>
<td>5.564</td>
<td>4</td>
<td>0.234</td>
</tr>
<tr>
<td>Risk Tolerance</td>
<td>3.257</td>
<td>4</td>
<td>0.516</td>
</tr>
<tr>
<td>Openness to Learning</td>
<td>5.979</td>
<td>4</td>
<td>0.201</td>
</tr>
<tr>
<td>Competitiveness</td>
<td>4.062</td>
<td>4</td>
<td>0.398</td>
</tr>
<tr>
<td>Managing Money</td>
<td>2.246</td>
<td>4</td>
<td>0.691</td>
</tr>
<tr>
<td>Being a Leader</td>
<td>7.233</td>
<td>4</td>
<td>0.124</td>
</tr>
</tbody>
</table>

Our findings revealed that females can be equally entrepreneurial in comparison to males. Other authors have also asserted the entrepreneurial potential of females (see Jones et al., 2008; Shinner et al., 2009). In this context, Nabi and Holden (2008) have mentioned an increase in female participation in entrepreneurial activities. Gender related entrepreneurship studies also put forward stereotypical connotation and consider entrepreneurship as a male gendered concept. This can potentially discourage women in undertaking entrepreneurial initiatives. Therefore, government sponsored initiatives should focus on nurturing female entrepreneurial potential as it can also result in socio-economic growth (Nabi and Holden, 2008). Further, women entrepreneurship should also be a key element of entrepreneurship education. This present study, takes in depth view of the students’ entrepreneurial attitudes in a GCC region country. It sets the stage for future research in other settings in order to confirm the findings of this research.

References


On Cultural Impetus for Innovation

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Abstract

Culture is a product accumulated throughout the history of mankind and is an intellectual wealth of mankind. Innovation is a process in which people utilize the existing resources and essential factors of production to create new achievements. Culture has intrinsic function mechanism for innovation. Culture that encourages innovation and tolerates failure is helpful to develop the innovation potential, while the restrained and conservative culture will stifle the innovation. Therefore, it’s necessary to fully exert the positive effect of culture on innovation and turn culture into important impetus for innovation. The motive effect of culture on innovation is a very complex process. From the perspective of function, the guiding, integration and educational functions of culture are in favor of the formation of innovative ideas, objectives and thinking, while the restraint and cohesive function of culture can motivate or restrain the innovation activities. From the perspective of composition, the deep-seated value system mainly promotes the formation of innovative thinking, innovative spirit and adventurous spirit; the intermediate institutional and behavioral culture has effects on people’s innovation behavior; the superficial culture plays an important role in forming innovation ideas, cultivating innovative ability and creating cultural atmosphere of innovation.

Keywords: Culture, innovation, cultural function, cultural impetus, functional mechanism of cultural impetus
Background

Issue Presentation and Its Research Method

A common view has been formed that culture has a motive effect on economic development. Scholars have conducted wide and in-depth researches on the effect of national culture on a country’s economic development, the effect of regional culture on regional economic development as well as the effect of enterprise culture on enterprise development. In recent years, scholars turned their attention to the research on the effects of culture on one of production factors - human behavior, especially on the effect of culture on innovation. Therefore, how the culture promotes innovation and what its functional mechanism is are two important issues that deserve in-depth discussion. In this thesis, the cultural impetus mechanism of innovation is discussed by way of induction.

Culture Is the Impetus of Innovation

Innovation is a creative activity of mankind as well as the revolution of old things and the creation of new things. According to the definition given by Schumpeter (1912), innovation is to introduce the “new combination” of the essential factors and conditions of production into production system. The form of innovation includes: product innovation, production technology innovation, market innovation, supply channel and product marketing innovation, service innovation, etc.; the content of innovation includes: innovative idea, innovative spirit, innovative thinking, innovative character, innovative behavior, etc.

Culture is the historical accumulation of human cognition toward nature and society in the process of production and living; also, it is the fruit of human civilization. Hayek believes, “Culture is neither natural nor artificial, neither genetically transmitted nor rationally designed. It is a tradition of learned rules of conduct which have never been ‘invented’ and whose functions the acting individuals usually do not understand (Hayek, 2001). William A. Haviland thinks “Culture is a set of rules or standards that, when acted upon by the members of a society, produce behavior that falls within a variable range the members consider proper and acceptable.” Geert Hofstede argues that culture is deeply rooted values or shared norm, moral or ethics principles that guide action and serve as standards to evaluate one's own and others' behaviors (Sanchez, 2004). From the above, we can conclude that culture is values and code of conduct accumulated in the long history of mankind; it is an “invisible hand” which exerts great influence on human behavior.

Culture determines innovation. Engels (1972) pointed out, during the 15th-16th century, that without the unprecedented cultural atmosphere created by the “Renaissance” during which the science, literature, art and thought were prosperous universally, “the greatest progressive revolution that mankind has so far experienced” would not appear in Europe. Annalee Saxenian pointed out in his work — Regional Advantage:Culture and Competition in Silicon Valley and Route 128, that regarding geographical location, Silicon Valley is inferior to the area of Route128; in the aspect of talents, Silicon Valley may not have great advantage; however, expanding from small to large, it becomes the model of our hi-tech development areas for learning and imitating. In the ultimate analysis, this stems from its special culture which is more important than technology, capital and talents. This culture is “social capital” with great competitiveness, which is deeply rooted in the soil of society and is difficult to imitate (Wang, 2002). In fact, the regional culture of Silicon Valley is important impetus for the scientific and technological innovation of Silicon Valley. This culture includes: encouraging adventure, tolerating failure and “betrayal”, being bold to compete with others, attaching great importance to cooperation, enduring hardship and working hard, keeping on starting enterprises and placing ability in a highest position.
Cultural Impetus Mechanism of Innovation

Culture can be defined in broad sense and narrow sense. Culture means ideology in narrow sense; while, in broad sense, it refers to the total of all material and spiritual wealth created in the historical practice of human society. Generally, according to the difference of cultural influence on human thinking and behavior, culture is divided into three levels: the first, is spiritual culture that is deep-seated and plays a key role, including mission, vision, values and spirit; the second, is institutional and behavioral culture that is at the intermediate level, is specific conduct code and habit, and is determined by core level, including various systems, codes of conduct, ways of action and standards of conduct; the third, is superficial culture that is at the surface level and is the symbol, word or others that have specific images and are simplest and easiest to understand; it is determined by core level and intermediate level and embodies them. Among them, the first level is the most stable, the second and third levels often change with environment and strategies. From the perspective of function, culture has the functions of guidance, motivation, cohesion, restraint, integration and education; the value system has the functions of guidance, motivation, cohesion, and integration; the institutional and behavioral culture has restraint function and the superficial culture has education function. The cultural functional mechanism for innovation is as the following: the guiding function of culture producing guidance force, which promotes the formation of innovative idea and finally guides the direction of innovation behavior; the motivational function and restraint function of culture combined with cultural atmosphere form motivational force, the cohesive function of culture and cultural atmosphere together form cohesive force; and the motivational force; and the cohesive force promote the generation of innovative behavior; the integration function of culture produces integration force; educational function gives rise to cultivation force, and these two forces promote the formation of innovative thinking; cultivation also facilitates the accumulation of knowledge and building of innovative character, and finally promotes the formation of innovative ability (as shown in Figure 1).

Figure 1. Cultural Impetus Mechanism of Innovation
Discussion

Guidance Force

All cultures have value orientation, which stipulates the objectives and behaviors pursued by people, and they all have guidance function. Shared values and mission function are guiding the values and behavior orientation of individuals. Especially, the core values of a culture determines the orientation and key points of innovation: whether the innovation is independent or follows and simulates others or we carry out innovation after introducing; whether we concentrate strength on making technological innovation or make both technological innovation and innovation of product, system, management so as to display the overall advantages of the innovation system; whether we focus on small innovation and develop general technologies, or focus on original and major innovation and develop core and key technologies independently. With different values, the innovation idea and objective will be different, and so do the innovation behaviors. The Founder Group proposes the idea of “The world is changing; innovation is not” and the development mode of “Being of indomitable spirit”, continuously pursues new breakthrough of high technology and promotes the application of high technology. Finally, it helps the publishing and printing industry free itself from “lead and fire” and enter the era of “light and electricity”, and becomes the technical leader of Chinese printing system in the world (Zhao, 2008).

Motivational Force

Motivation theory argues that the best motivation method is to make the inspired take action and bring their specialty and potential into full play. Psychologists believe, without motivation, people can bring only 10%-30% ability of themselves into full play; with material motivation, 50%-80%; and with appropriate spiritual motivation, 80%-100% or even over 100% (Jia, 2003). Cultural motivation to innovation is spiritual and its motivational function is shown as follows:

First, motivational function of pioneering spirit. Any innovation is a kind of exploratory work that challenges the traditional thinking, convention and authority, so it requires leading awareness to seek differences and innovation and to dare to break through; any innovation is at great risk of failure; any innovation is extraordinarily hard research work, so it needs painful thinking, painstaking exploration as well as a lot of experiments, tests, calculation, etc. Therefore, innovation needs more spiritual motivation. As an important component of spiritual culture, the innovative spirit provides the innovator with spiritual pillar and motive force. The innovative spirit includes exploring spirit, adventurous spirit and hardworking spirit. The exploring spirit can motivate the scientific and technical employers to constantly explore, seek difference and innovation and be bold to break through; the adventurous spirit can motivate them to defy risk, to pursue persistently and never to say die. Hardworking spirit can motivate them not to fear hardship and difficulties and to overcome all obstacles so as to achieve success finally.

Second, motivational and restraint function of institutional and behavioral culture. Institutional and behavioral culture that stands at intermediate level includes written or conventional systems formed for a long term, ethics, custom, etiquette, habits and other norms of conduct that have positive and negative motivational (restraint) function. Systems are the aggregation of written planning, procedures, regulations and laws formulated, promulgated and executed to maintain the order of production, work and life. In general, it contains ownership system, leadership system, institutional structure, managerial system, operational rules and system arrangement that stipulate the relationship among interest parties (Dai, 2002). It stipulates behavior pattern, procedures and rules that are used for dealing with various relationships, all of which the employers shall follow. Typical function of systems for the innovative motivation is the establishment of patent system and generation of venture capital system. Since the former restricts the malpractices that someone captures other’s technology illegally, it protects the legal rights of the patentee. After the establishment of patent system, new technology springs up like
mushrooms; the latter can diversify, transfer and reduce the risk of hi-tech innovation and make the technical innovator obtain high return, so that it greatly arouses their enthusiasm and promotes them to transfer the technology fast into productivity. The rise of American Silicon Valley benefits from the venture capital system.

Scientific ethics are the codes of conduct for scientific and technological innovation. By self-discipline mechanism and heteronomy mechanism, it will restrict and standardize the conducts that do not conform to the scientific ethics, and guide the scientific and technical staff to obey new rules and scientific codes.

Third, spurring function of cultural atmosphere. Innovation needs relaxed and free cultural atmosphere. Cultural atmosphere of innovation includes innovative attitude, emotion and atmosphere. The government shall advocate and support innovation, and the masses shall actively involve in innovation. The winners shall be encouraged and honored, and the losers shall be tolerated and go down swinging. Such cultural atmosphere can spark innovation and the spark of innovation will become “blazing prairie fire” finally. On the contrary, a closed, self-important, conservative culture that despises failure will stifle innovative concepts and thoughts. Success of Wenzhou benefits from the innovative culture that dares to be pioneering, takes the risk, makes their home wherever they are and builds an enterprise through hardship. Therefore, we shall conduct vigorous publicity to endeavor to cultivate a cultural atmosphere that encourages innovation, benefits innovative thinking and fully exerts innovative ability.

**Cohesive Force**

Culture has the cohesive function. First, the culture combines personal ideals and pursuit objectives with integral development purposes and objectives, and integrates the personal prospects of employees into integral development so as to make the employees establish common ideal, faith, objective, and values that center on the whole. In this way, the strong centripetal force will be generated in the collective. Second, the culture displays strong “group consciousness”. Once the employees recognize it, their thinking and behavior will follow the group consciousness spontaneously; hence, the dispersed individual strength will be gathered and become a part of the whole strength. Third, the collective is not only the backing of employees’ benefit but also their spiritual home and hope. Excellent cultural atmosphere will make the employees feel at home and have a sense of belonging; hence, their spiritual sustenance will rest on the collective, their emotion will attach to the collective, and their behavior will be loyal to the collective; they will stand together with the collective regardless of situation changes and integrate their destiny with that of the collective. Practices prove that, the employees will feel reluctant and uncomfortable if they leave the habitual collective with common values; also they will have a feeling of “immigration (Li, 2002).

**Integration Force**

Culture has integration function that can generate integration force. First, integration of individual values. Individuals in an innovation team have their own values; however, the individual values and collective values often fail to meet each other. So individual values need to be intergrated. Cultural integration function can integrate individual values into collective values which benefit innovation. Once the individual recognizes and accepts the collective values, the individual innovation will be promoted. Second, integration of collective values. This is mainly used to resolve the conflicts of values in the merger of enterprises. In merger and acquisition, without realization of cultural integration, the merger and acquisition is doomed to fail! In contrast, if the cultural integration is emphasized, the merger and acquisition must be successful, e.g. Haier used its culture to activate “Shock Fish” in the merger and acquisition and achieved success (Gu & Yan, 2002). Third, integration of innovative resources. Innovation requires various resources, including manpower (innovation subject), financial resources
(capital), material resources, information, etc. However, culture is the adhesion agent of these resources elements. Values will determine the orientation, combination and efficiency of limited innovative resources. Therefore, integration of innovative resources depends on values ultimately, especially the core values.

**Cultivation Force**

Culture has educational function. Education can achieve accumulation of scientific knowledge, formation of innovative thinking, building of innovative character and acquisition of innovation methods. First, the formation of innovative thinking requires cultural education. Culture determines the thinking, and thinking does the ability. All kinds of thinking modes of effective innovation are the results of excellent cultural status and culture power constituted by uniting and interacting inner spiritual elements of human, such as knowledge, science, experience, ideal, belief, aesthetic appreciation, art, moral, thought, psychology, philosophy, world outlook, value system, methodology and character. The selection and application of thinking is also that of culture. Without overall support of culture, there would be neither the advanced thinking methods nor the effective innovation thinking ability. Second, innovation needs professional knowledge and innovation methodology. Through education and cultivation, the educatees may acquire the professional knowledge necessary for innovation and innovation methods. Third, the innovative characters include curiosity, imagination, confidence, challenge and adventure, all of which are built by infusing, influencing and training of culture.

**Conclusion**

To sum up, culture is the impetus of innovation. Cultural impetus for innovation is composed of guidance force, motivational force, cohesive force, integration force and cultivation force. With these forces, culture exerts motivation and cohesion on innovative talent, promotes the formation of innovative idea, objective and thinking, and propels the accumulation of innovative knowledge and the building of innovative character. Thus, the culture shall be used to form ideas, cultivate spirits, bind the will of people, inspire the fighting spirit and promote the constant emergence and development of innovation.

**References**

Abstract

The industrial democracy is an important approach of management practice focused on motivation and cooperation aspects. The early theoretic grounding work has been developed by the Norwegian researcher Thorsrud (1970) and his theory on industrial democracy. The Norwegian government paid much attention for this practice and inspired this philosophy in the labor law. The Research Council of Norway (NFR) also initiated a research program (VRI) to stimulate and encourage partners as industries, research and educational institutions cooperate in finding ways of improving productivity while creating better working environment. The Norwegian industrial democracy (DNM) is a practice and field experience-based theoretic model, developed by action research methods in Norwegian companies. The essential philosophy of DNM is a deep involvement of everyone in the organization as a part of decision-making process. This article is written about a case for DNM process and applications in a small, private Norwegian company. The research team’s observation and analysis suggested that the DNM application could be characterized as an informal development, but ended up and solved by socio-tech and organizational approaches.

Keywords: Industrial democracy, productivity, organizational approach, research cooperation
Background

The Case Company

The case company is a private small company that produces and packages juice for large groups of wholesales chains. The industry is highly process-based with relatively updated equipments and technical solution. The working tasks are highly volume-based production and highly automatic operated. The production workers are therefore required to be highly mobilized and job rotated, as well as competence updating in order to meet production requirements.

The nature of this case company is private and family owned business while the company structure is rather as centralized and in top-down format. There is a physical distinction between management and production lines, thus one kilometer distance between the company’s management office and production location, and the top management team is seldom to be observed in the production location. The distinction also can be observed culturally and by different attitudes through research team’s interviews.

The Research Questions

The following research questions are brought based on the project experiences, observation and data information from the case company:

1. What are the necessary elements and successful criteria for DNM applications in a company environment where DNM is not generally accepted or understood?
2. How important is informal project organizing in contributing to the DNM application?
3. How should a DNM introduced into a none-DNM familiar company or environment?

The following story of the case company from the project period provides readers few detailed events. The research was based on action research (AR) approach and every single case/story contributes further experiences of knowledge enrichment and data collecting for full analysis and conclusions.

The Project

The project at the case company initiated in 2005 and was meant to be approached similarly and other DNM projects in the region. The essential goal was to improve the company’s productivity through DNM approach, particularly through better cooperation between production workers and management, and more decision involvement from the workers. The project was defined as a single company focused on action research project, under the category of company research project on VRI.

After the project initiation, it has been introduced and applied some common DNM practices or methods, experienced from other case companies such as dialog conferences for the whole staff, formal project meetings with top company leaders and union representatives, even project information meetings with operators and production workers to motivate their engagement to this project. Despite of these actions, the management seemed not being directly interested in the DNM approach and production workers were not engaged neither. The direct DNM approach seemed not to be a very attractive option for the case company. The research team has debated many times over the validity of this case project and necessity of letting the company take part in the VRI research program or drop off this case. However, there are the contradictory events to be observed and relevant issues for this project to be debated:

- The project has “survived”, thus engaged in, almost the longest compared with other VRI company projects, indicating the interests of participating from the company.
• The productivity and efficiency have increased significantly nearly 20% during the project period, succeeded what DNM intended to reach for.

• There have been significantly attitude changes, both among the production workers and management regarding DNM importance and applications.

Though the formal DNM process has been reduced, the efforts for DNM application in this company was never been stopped. The alternative approaches, as informal DNM process, has been experimented and evaluated during the project period. A few observations and reflections are noticed and these data materials might lead us into the research questions in terms of DNM applications, alternative solutions and reflections.

The Social-technical Approaches

The case company management, like other business management, is engaged in production productivity and product quality and this is the main access for the research project. The social-technical approach is the crucial element to define the project objectives at the company level. The project plan presenting for the company must include defined technical improvement with detailed specifications and these must also meet the company’s expectations.

This particular project will contribute to increase value, efficiency through team building and better utilization of resources. This will be done through specific defined technical subprojects in reducing waste and improving logistics. It is important to have active participation in specific sub-projects with broad participation of management, employees and trade union. Project activities will be integrated with the research within the current themes in sub-projects. The new knowledge generated in the sub-projects will be published as popular science and scientific journals, and will be brought back to concrete activities in the sub-projects, and contribute to increase value, efficiency and increase expertise in the areas concerned.

Methodology

In 2006, the company expanded its order at the same time upgraded a production line, both with very short notices before hand. The new and increased production volume plus a new package line are the big challenges for the production workers. The production results were sufficiently good, but workers were driven into a changing process without preparing and learning and this caused certain frustrations.

The research team did a survey by the end of 2006 and reflected on the survey from workers is a further and concrete step to question or verify the crucial point in technology transfer, and in this case, a new package line: The ability to use the technology according to Levin (1997) on managers’ and workers’ understanding of what knowledge is and it built into the machines and tools to achieve necessary skills and motivation to operate it efficiency. This is the crucial point in technology transfer.

About the organizational issues during the technology transfer, the action research scholar discipline and the Tavistock Institute committed itself to do practical research using the socio-technical system design principles in the Norwegian Democracy Project in Norway in the 1960s. The Democracy Project carried out a set of experiments on different kinds of industry located both in urban and rural areas (Elden, 1979; Thorsrud, 1970). The results from the Norwegian Democracy Project had a major impact on how to organize industrial work in Scandinavia. A central realization from the project was that participative approaches were necessary in order to increase the industrial democracy.

This approach became a design criterion for all interventions in industrial organizations. New management ideologies are developed, focusing on good social relations (Vanebo & Bush, 1988). This
main concept from the project is still valid: “the socio-technical thinking is building links between the technological system and the organization” (Levin, 2002).

Results and Discussion

The 2006 survey outcomes indicated that there was a huge need for knowledge and competence in upgrading the new machine installed in the package line, and also a need for good social relation at the plant. The crucial issue on technology transfer was identified not also as training need for operating the new machine, but also employee participating for the planning stage. This could be done in a better way. There were also variant elements in social relations and attitudes that might become hurdles for further productivity lifting. If the company wishes to expand its production productivity, there must be options for improving the mentioned issues in human aspects, since the machine was already new.

Based on the social-technical philosophy, the survey outcomes from 2006 and action research approach, the research team made few process steps on DNM practice in the case company. Starting with focus on productivity improvement and quality issues, the technical specifications during the production and on job-training for operating new machines are taking in part as the particular DNM process goals. Moreover, the project also conducted by decentralized approaches that researchers are involved in as facilitators or brokers for few internal meetings for employees, so the operators can speak freely without their direct managers in the area. The research team also engaged 2 student projects in 2007 and 2008 and using college students to collect information and opinions from the operators. The student projects were easy to initiate since the research team members are from a local university college and have integrated projects as a part of study program.

The successful conducting of student projects at the company, which was a success, was a turning point further engagement of DNM research for the company. Although the students worked on “lower” level of the company and tasks, they had direct contact with operators and they observed first hand information from the production process. Above all, they also worked brilliant as brokers for communication and information exchange between the management and workers at the production. Their projects resulted into important findings about the wasting during the production, which was technical issues but might be able to improve through human cooperation. As a result, the success of student projects credited the cooperative atmosphere at the company and openings for further project proposals from the research team.

During the same period, other approaches were also applied to build up close cooperation atmosphere between the company and research team. The company was invited to give the practical case presentation as a part of university lectures to enrich the students’ industrial knowledge.

One research team member was placed in the company for the determined period, partly for learning the industry and being more familiar with the company, and partly for continuing the research data collecting from the production workers for organizational development, wasting issues and productivity lifting. As a result, the research team member learned more industrial knowledge and became familiarized with the company and its daily tasks, but most important of all, built up the trust with production workers and collecting the data for further steps. There has been made many observations during this placement linked with possible productivity lifting.

The observations noticed the facts that company’s machine and technical facilities are sufficiently good and the production line are modern machinery with high production volumes and few operators with much needed skills, training services, especially for new employees. These are essential for the business. It is not about highly labor intensity, but knowledge and process intensity tasks at the production workshop. There is a good possibility to increase productivity once the coordination and cooperation are better performed. Organizational and work related attitudes are the key element for a better cooperation atmosphere but this requires deep involvement on a personal and individual level. By this stage, DNM is perfect approach to aim and solve the mentioned problems.
Conclusion

The research process at the company is not completed yet, but the observations and data collection so far has enriched our knowledge about the research questions that we have been addressed earlier:

1. What are the necessary elements and successful criteria for DNM applications in a company environment where DNM is not generally accepted or understood?
2. How important informal project organizing is able to contribute to the DNM application?
3. How should DNM be introduced into a none-DNM private company or environment?

As an action research approach, a long term research engagement and continuation network with case company might be a good answer for necessary element for DNM applications, even when DNM was not generally accepted or understood at the beginning. Reviewing the story back to the research project initiation in 2005, the research team has gone through the experiences on a changing process from the startup to recent. At the beginning, there seemed to be no engagement for DNM generally, not until the research team found out that DNM might be not suitable for the case company. Neither there was formal structure supporting DNM, nor atmosphere for DNM neither. However, the 2006 survey indicated there was a “latent” need for DNM application for better working environment and productivity lifting. The consecutive efforts and outcomes confirmed the necessity of DNM and its possibility at the company. Therefore, long term engagement and patient approaches, focused on technical improvement but approached through social elements must be one of the successful criteria.

Although the social-technical system is the essential approach for problem solution, it was important to start with technical issues which was generally easier to be accepted, focused on and not at least, to come out with quick results for further project approval. The DNM final intention was also higher productivity, so it was essential to mention this final goal to the company management at the start.

The small organizations are often with informal structure and act quickly, and these are the case for DNM application. The informal project organizing was very important to this case company and this is the culture of doing things here. Hence, the DNM introduction might follow the same pattern so management and workers are familiar with DNM. The research team conducted few none-DNM projects (as student and staff placement projects) to build up necessary trust and network in the company, for further DNM application. The key company persons found this approach were more viable and also practiced into an on-job training project.

The informal project organizing merely means thinking the projects from the company’s need and based upon the company’s availability. DNM is not one fixed approach and is rather a philosophy that applies possibly variant ways in practice. In a sense, the traditional DNM methods might be modified as for example, trade union representatives’ involvement or formal discussion meeting with management in every detail might be questioned for necessity.

The conclusion for this study is that DNM application is quite possible for a none-DNM company. However, the traditional and classic DNM approaches might not work for such case. The researchers need to approach in an innovative way, but this is also the key issue of an action research approach. There is no fixed menu for approaches but few key elements are essential for the successful DNM introduction for companies: Long term engagement, patience, speaking the industrial languages avoiding academic lectures, and making efforts for mutual communications, understand what the company’s current need and integrate it with DNM projects.

The complexity of industrial democracy and DNM is that it sounds like a political manifestation although the methodologies are highly research based. The DNM applications are also relatively complicated and it needs involvement every individual in the organization to understand the whole concept and practice it. It is therefore not a speedy project, but rather a long term engagement with
multiple approaches. Training education must also be necessary elements. At the end, the company management engagement and necessary resource budgeting are all criteria for the successful DNM applications.

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