

Innovation Measurement Software

Master Thesis
in
Innovation management

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Abstract

Innovation is essential in our technological society. There exist a large number of innovative companies in the world, however, still there is a great scope for many others to join and take advantage of this treasure that have caused success for many organizations.

There are a growing number of authors in the field of innovation, that have a mount of articles about innovation, innovation management and innovation management tools. When approaching more to the innovations assessment tools however, there is a lack of required tools for measuring innovativeness in organizations.

This master thesis is based on an international data base from a survey of 221 companies in 2009. The analyzes is based on the survey which includes 95 questions, that are divided into four areas, dependent on company characteristics, innovation factors, internal and external factors. The main questions of this research is which industries/sectors are in general more innovative than others, and what are the factors influencing this? Which industries are more focused on product, process or service innovation? The relationship between companies size, revenue, profit with identifying external partners for collaborating and innovation is discussed as well. A number of innovation management tools are studied here, like learning and education to employees, sharing best practises in organizations, having good metrics for evaluating the success in organization etc, with the question if these tools influence organizations and help them become a leader in innovation?

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Chapter 1

Introduction

1.1 Background

This master thesis starts at Logica, a global IT and management consultancy company headquartered in Reading, United Kingdom. In 2009, Logica in collaboration with INSEAD¹ made an international study among 221 companies and sectors in the world. Owing to this successful survey, a software called “Innovation Readiness Scan” (IRS) has been developed in order to help companies measure and enhance their capacity for innovation. The software has been widely used in many companies over the world, but is quite new to the Swedish market.

The aim of this master thesis is to introduce the previously mentioned software, IRS, first to Logica’s customers and then to all existing companies in Sweden. With the data base of 2009 as background, a further step is supposed to acquire a more advanced software that can satisfy as many companies’ requirements as possible.

1.2 Thesis objective

- Study the most central conception about innovation, that is necessary for the understanding of the thesis as well as for the software development.
- Bring the software to the Swedish market.
- Analyze the data collection from 2009 to connect the theory background with the reality of managing innovation in organizations.
- Through the data analysis, give the answers to the following research questions:
 - How do companies manage their internal structure to become more innovative?
 - What are the factors/characteristics that help measuring the innovativeness of an organization?
 - Could the result from the analysis prove the theory about innovation?

¹One of the world’s leading and largest graduate business schools.

- Expand the scope of the questionnaire for further development of the software when implemented in companies.

1.3 Justification

The intention of this thesis is to analyze the data-scan² and find out which companies are more innovative in consideration of their size, characters and behaviors. The very first step is to give the readers the essential theoretical background through “conceptual framework” that is intended to provide a feeling for the whole work.

Then it proceeds by describing the software IRS and its different dimensions: Leadership and ambition, Organization and collaboration, Implementation and measurement and last People and culture. Nowadays many companies are in need of some tools that propose them strategical improvements in the organization. Thus, IRS enables companies to measure their innovativeness and benchmark the organizations’ innovation readiness internally between different departments in an organization as well as externally between different organizations. Last but not least, IRS is appreciated in many countries due to its ability to provide companies with different areas of improvement that help them to fill the gap between the organizations’ stated goals and its capacity to achieve them.

A brief description about Logica is introduced in chapter 2 with the intent to lay foundation for IRS while capturing the readers’ attention to this master thesis.

Method, result, discussion and conclusion are supposed to be the central parts that exploit the data-scan to analyze the characters of different organizations and the related innovation internal respective external factors. The desirable destination of this analysis is the development of a new and more advanced IRS, that can be applied to different types of companies with different sizes and objectives.

The Questionnaire chapter plays an important role in cultivating and opening new potential/opportunities in developing IRS in organizations in the near future.

The last chapter, namely *limitation*, takes up the restrictions with this master thesis while suggesting new ways for expanding its scope.

²A collection of 95 questions with corresponding answers from 221 companies

Chapter 2

Logica

Logica is a leading business and technology service company, which provides business consulting, systems integration and outsourcing to clients around the world, including many of Europe's largest businesses. By successfully integrating people, business and technology, Logica creates innovative answers to clients' business needs under long term collaborations. With 41 000 employees across 36 different countries (5200 in Sweden), Logica is always striving for the vision: "Let's be brilliant together"[1]. Logica's partnership and collaboration focuses on joint sales and business development. Logica under the long term collaboration with Microsoft, Oracle and SAP can provide its clients the best possible solutions and applications that adapts to the clients business.

Logica has several Spark Innovation Centres in different countries, like two in India, which are for Mobility and ITS¹. One of spark innovation centre is located in Stockholm called, Next Generation Workplace (NGW), and there are more to follow. These room are designed to stimulate creative thinking during the meetings or conferences. Next Generation Workplace is a concept that focus on the work situation, existence of the right tools and right support. In general NGW will create a work place where employees can work more efficient than before, now and in the future.

Logica is an organization where everything centers on innovation and sustainability. Logica believes in collaborative innovation and client closeness as means to outperform competitors. They provide solutions for their customers by collaborating with other firms, constantly talking to partners, suppliers, researchers and experts within the areas of interest. Logica shows their customers how they can work smarter, how they can protect their business information and being more profitable. At the same time Logica continuously strive to provide effective solutions, sustainable business ecosystem and deliver the best service that perfectly matches their customers existing business. The result appears in the reduced cost and speeding time to the market. From these achievements and innovation contribution they approach competitive advantage[2].

¹Intelligent Transport System

Chapter 3

Conceptual framework

3.1 Innovation

When formulating a corporate strategy to increase the turnover, every company tries to provide an answer to the following questions: what are our stated targets and why? What are we capable in the process of making profit and why? What are we intending to do and why? And finally, how can the stated targets be obtained? Nowadays innovation more and more plays an important role in answering these questions. Thus, it is necessary to clarify first what's meant by innovation.

Innovation is understood as the process of exploiting creative ideas to successfully achieve a new product, process or service that is better or more effective. A common mistake is to use “innovation” and “creativity” interchangeably, when they are not the same. They are related one another, but the terms should be used in different contexts. Creativity is about coming up with ideas, while innovation is about “bringing ideas to life”. Creativity may be displayed by individuals, while innovation occurs only in the organizational context by converting new creative ideas to a real product, process or service[3]. Besides the previous concept, “invention” is also regarded as a familiar term that is worth to be mentioned when defining innovation. Invention is the first occurrence of an idea for a new good or a new process, while innovation is the first attempt to carry it out into practice, that is, when there is a transaction in the marketplace [19]. Briefly, innovation is considered to be the extension of invention, while creativities can be regarded as one of the building blocks enabling the path from new thinking to invention and finally to innovation. This connection is clarified in the following figure:

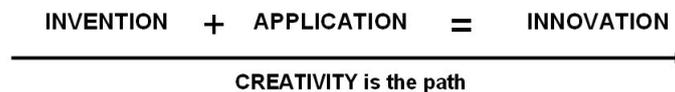


Figure 3.1: *An invention results into an innovation through an application/a business model [37]*

A definition is always important but never enough. For a clearer understanding of in-

novation, many other factors/characteristics of innovation need to be discussed here. By identifying what types of innovations exist, every firm may be aware of the way these different kinds of innovations can be managed and thus grasp the suitable opportunities to bring each type of innovation to the market.

Based on the nature of innovations we can distinguish between product and process innovations. Product innovations involve the occurrence of new and improved material goods or intangible services while process innovations involve the improvements in the ways of producing these goods and services. Process innovations may be technological, organizational or marketing related, depending on if it is a new type of machinery or a new way to organize work.

Based on their character, innovation can be divided in two types: radical and incremental innovations. Breakthrough innovations are considered to be “new-to-the-world” and refer to the “out-of-the-blue” solutions that did not exist before. These innovations cannot be compared to any existing practices or techniques. They employ new technologies and create new markets. Incremental innovations, on the other hand, refer to the continuations of the existing technologies or practices. They involve extension of products that are already in the market and they are more evolutionary in nature. That way, new-to-the-country and new-to-the-firm innovations can be identified. Most incremental innovations are created in response to the customer needs. Most investors prefer to invest in incremental innovations rather than breakthroughs. Breakthroughs seem to be very attractive but very risky at the same time, while incremental innovations don’t involve such a high risk, despite uncertainty is an underlying dimension of innovation. However every technology that people use is going to be replaced by some breakthrough at some point in time.

Innovation has not always received the scholarly attention it should deserve, because it was seen as a random phenomenon, which was impossible to handle [19]. Nowadays we all have become convinced of the important role of innovation owing to many researches which point out that innovation is the outcome of continuous and disciplined work. There are, of course, innovations that spring from a flash of genius. However, most innovations, especially the successful ones, are a result of a conscious, purposeful and systematic search for innovation opportunities. Those opportunities can be categorized but not predicted. Within a company or industry, there exist four main areas of opportunities: unexpected occurrences, incongruities, process needs and finally industry and market changes. Outside a company in its social and intellectual environment, three additional sources of opportunities exist: demographic changes, changes in perception and new knowledge. These sources are different in the nature of their risk, difficulty and complexity, but they may overlap and the potential for innovation may well lie in more than one area at a time. Even if they may have different importance at different times, all opportunity sources should necessarily be analyzed for a comprehensive overview of a firm’s potentiality. The first step for a systematic innovation is the analysis of the sources of new opportunities. Thus, “innovation is work rather than genius”. Besides talent, ingenuity, and knowledge, innovation requires hard, focused and purposeful work. In innovation context, talent, ingenuity and knowledge are of no meaning without diligence, persistence, and commitment [15].

As mentioned, innovation is a continuous process which requires a combination of different types of knowledge, capabilities, skills and resources. Therefore innovation involves teamwork, since workers/employees at every level are extremely important actors of the whole process. Of course, there is no universal or predictable solution or guidance for a company to succeed, but today innovation studies have increasingly suggested approaches and methodologies that make innovation possible in companies. Among others, the following approaches are worth to mention:

- “Openness” to new ideas and solutions is supposed to be essential for innovation projects, especially in the early phases.
- “Absorptive capacity” is considered a must for innovative firms, large as well as small.
- Sufficient freedom should be provided to groups of people or single individuals (i.e. teams and employees) within the organization in order to experiment with new solutions and establish patterns of interaction within and outside the firm that help coming up with new organizational ideas when confronting new challenges.
- Due to the heavily dependence of innovation activities on external sources, collaboration is an effective way for firms to work and create linkages in the network of organizations [19].

From the above text, we can conclude that innovation can and needs to be managed. However, the key question is how to manage innovation? How to work in such a systematic way to find and create values that bring a direct impact on the performance of an organization? The next section will introduce a theoretical overview about *Innovation Management* (IM) with a focus on the available routines for the daily practice of IM.

3.2 Innovation Management (IM)

Innovation Management (IM) is a collective term for the management and organizational processes to support and develop innovation capacity in firms, organizations and individuals. The focus of innovation management is to harness the internal respective external factors involving the organization and combine them in a creative way to achieve new and improved ideas, products or processes.

Because of its mutual interaction with a wide range of areas such as science, engineering, economics, strategic management, sociology and psychology among others, IM is considered a multidisciplinary topic, with a multifunctional nature [21][34]. Despite IM has been a growing field of study for past decades, it’s often considered to be equivalent to technology management or the management of Research and Development (R&D) [7]. Therefore one of the targets with this section is to point out the characters that distinguishes IM from the other fields.

For IM to be successful, it’s important to be aware of the link between the strategic plans of the company and its internal organizational processes, that is, the routines the company has established over time [4][8][27][20][14]. The strategy is only valuable

when it's implemented and renewed by the organization's internal mechanism, and vice versa, the routines of the organization are affected and renewed by good strategic plans. Therefore the three main levels building up the structure for the management of innovation processes are: strategic level, operational level and instrumental level [35][33]. The operational level provides the routines that help companies to reach their strategic targets step by step [8]. In turn, the instrumental level provides firms with a set of tools that make the previous routines possible in practice. Thus, these two levels help enabling the progress of the strategic level.

3.2.1 The strategic level

The focus of the strategic dimension is to make decisions about the organizational culture, the values and the objectives of the firm. Formulating an innovation strategy is a complicated task since there are many factors that need to be taken into consideration such as changing needs, preferences, technologies or a changing environment among others. The strategic level of IM depends thus on both the internal and the external environment, which explains the necessity of being very systematic and methodical in the strategic management particularly as well as in the whole innovation management generally. Therefore we can assert that the key role the strategic management plays in the management of innovation is in appropriately adapting, integrating and reconfiguring the internal and external organizational skills, resources and competences belonging to the firm, towards a changing environment [7].

3.2.2 The operational level

After the innovation strategy of an organization has been formulated, the operational level is prompted aiming at linking the firm's strategy with the resources it has and developing the firm's routines themselves. The mentioned routines are identified as the procedures which are implemented in order to guide the innovation process and affect the performance of companies. The goal of these routines is to reflect what is going on within companies [7]. *Scan*, *Focus*, *Resource*, *Implement* and *Learn* are the five routines, which are mentioned as the determining factors for the successful management of innovation [33][12][40].

The intent with the *scan* routine is detecting signals of change as relevant inputs for decision-making. This routine helps companies scanning the external environment for technological, market opportunities and other signals, collecting and filtering signals from competitors or potential partners on their strategies or technological development [7].

In turn, the *focus* routine implies the selection of the various market and technological opportunities. By focusing, the company needs to be aware of its current technological base and its fit to the overall business strategy. This will allow the companies to diagnose its knowledge base for picking up the areas with the suitable competences for the future [7].

The goal with *resourcing* is to propose all the possible combinations of new and existing knowledge in order to offer a solution to the problem a firm is facing. This can lay the foundation for the development of innovations through R&D activities

and create the conditions for creativity [7].

The *implementation* routine has the task of developing the idea into a marketable product or service and preparing the market (customers) before its final launching. This will require a close interaction between marketing and technical-related activities. In this routine, companies will not only have to release the product and make it available in the market, but also to protect its sustainability and to provide the necessary after-sales support [7].

Finally, the *learning* routine aims at analyzing the organization's failures and successes as an input for the future innovation processes [7].

These five routines are recommended to be applied in companies in consecutive order, but for many companies it's not necessary to follow all the routines in place in order to manage their innovation processes.

3.2.3 The instrumental level

Finally, the instrumental level is regarded as the last determinant dimension that gives a comprehensive approach to the management of innovation. In this level, several tools are made available for their use to companies, what explains its name as instrumental [38][6][34]. All the tools included in this level are somewhere in between the idea generation and the introduction of the concept/ product/ system in the market, that is, between invention and innovation. Thus, they allow innovation to be done in a continuous and sustainable manner over time [7].

For the sake of simplicity, many of these tools are delimited into very simple stages or steps. This allows the users of the tools (employees/companies) focus on the purpose of the task (e.g. idea generation, technology watch) instead of concentrating on the content of the task. Section 3.4 will introduce a more detailed description on the general tools that belong to this instrumental level.

As we see, these three levels/dimensions are related to each other in order to align the operative areas of the company with its strategic targets. Now when all the levels needed for managing an innovation process are introduced, a question pops up, namely, how to innovate? It usually requires much effort and a disciplined work along the way from a bunch of ideas at the very beginning to the final result so called innovation. The next section will take up all the essential steps in an entire *innovation process*.

3.3 The Innovation Process

The development of innovations implies discovering, creating, and developing ideas, refining them into useful forms, and their final use to earn profits, increase efficiency, and/or reduce costs. Here we focus on how to do that, the process of innovation [25].

A recent study has pointed out that success at innovation does not only depend on how much money is spent on R&D, but rather on the quality of the innovation

process [26]. So it's crucial for firms and organizations to know how to achieve better results with their own investments.

Due to character of the innovation process, many of the ideas at the input stage only result in a few completed and useful innovations at the output stage, so the innovation process can be visualized as a funnel. However, "the trick to making it work is knowing what's supposed happen inside the funnel" [31].

Many may think that raw ideas are the seeds of innovation and therefore one should start the innovation process by collecting a whole bunch of ideas. However, this is not the case. Since innovation is the core element of an organization's strategy, one should start with strategic thinking to assure that the output of the innovation process are fully aligned with the organization's strategic intent. In other words, a firm's innovation strategy should be aligned with its corporate strategy [25]. Here we point at the main steps that should be developed inside the "funnel", being *strategic thinking* the first step:

Step 1_strategic thinking: in this stage, we try to answer two questions: how innovation is going to add value to the company's strategic intents and in which areas innovation will get the greatest potential to provide strategic advantage [25].

Step 2_portfolio management & metrics: because the management of innovation can imply successes, surprises, wrong turns or failures along the way, this step is introduced for managing the innovation portfolio in order to balance the inherent risk of unknowns with the targeted reward of success, and balancing the firm's pursuit of ideal with the realities of learning, risking, failing. At the same time, suitable metrics are also implemented parallel in this step to facilitate the management of innovation portfolio [31].

These two steps lay the foundation for the following steps to achieve the best results and thus constitute the input stages of the funnel.

Step 3_research: as the previous step helps releasing a design of the ideal innovation portfolio, the input of Step 3 is a right mixture of short and long term projects that enables the firm to get the highest possible profit. And this *research* step aims at filling the gaps between the firm's current knowledge and the knowledge needed for accomplishing its strategic objectives. By *researching*, companies can capture a wide range of unknowns, including emerging technologies, societal change, and customer values. That way, the firms will be able to discover significant new opportunities for innovation. Because of the direct connection between strategy, portfolio design and research, the newly discovered innovation opportunities/ideas are already and automatically aligned with the firm's strategic intent [25].

When all the knowledge and opportunities have been collected and all the ideas have been formulated and evaluated, Step 4, the so called *insight* step, is introduced as a peak achievement, a pause when communication, discussion are exchanged between members of the organization to pick out the very best choice of projects that may maximize the firm's innovation value. *Insight* is expected to come about as the result of the preceding activities, not a random step. Hence, *insight* is the outcome of a

dedicated process of examination and development [31].

Step 5 is *innovation development*, the process of design and engineering which transforms the great concepts into finished products, services and business designs. This process is supposed to be an integrated and multidisciplinary process which includes manufacturing, distribution, branding, marketing, sales and even interaction with customers [25].

Besides the focus on products, services or administrative tasks, it's equally crucial for firms to create good relationships with their customers. Therefore step 6, *market development*, plays an important role in the innovation process. This step is a universal business planning process, which aims at introducing the innovation into the market and instantly improving the sales growth. It begins with brand identification and development followed by the preparation of customers to convince them choosing this innovation [25].

The last step is *selling*, where the real payoff is achieved. For the product/service innovations, the firm can get the financial return by successfully selling the new products/services. On the other hand, process innovations can help the firm to reap benefit of increased efficiency and productivity [25].

Although each step of this innovation model has different focus and performs different tasks, they have the same target, namely to achieve and support the development of innovations in the organization. Therefore they have close and mutual interactions to each other; the success or failure of one step can affect the progress of the other steps and thus the whole innovation process. For this reason, the organization needs to measure the results in each of the steps and take the other steps into consideration when implementing them. In the figure, these seven steps of the model are divided into three distinct segments, which act as small cycles/processes^{3.2}.

3.4 The Innovation Management Tools

As mentioned in *the instrumental level*, innovation management tools help facilitating the implementation of the steps in the innovation process. By the systematic use of IM tools, innovation can be done in a continuous manner.

A management tool is defined as a “document, framework, procedure, system of method that enables the company to achieve or clarify an objective” [5]. In fact, the definitions of IM tools are very similar to the definition of general management tools. Moreover, all the terms such as tools, technique, practices, methods, methodologies, systems and procedures have been used in similar contexts, which often overlap each other. For these reasons, it's difficult to give a clear-cut definition of what IM tools constitute [7].

Among a large number of tools which have been developed to clarify the practical and conceptual issues associated with the management of innovation, several should be listed here: diagnostic audit methodologies [11][18], creativity [16][39], technology foresight [9][30], knowledge management [32], intellectual capital [36], lead-user

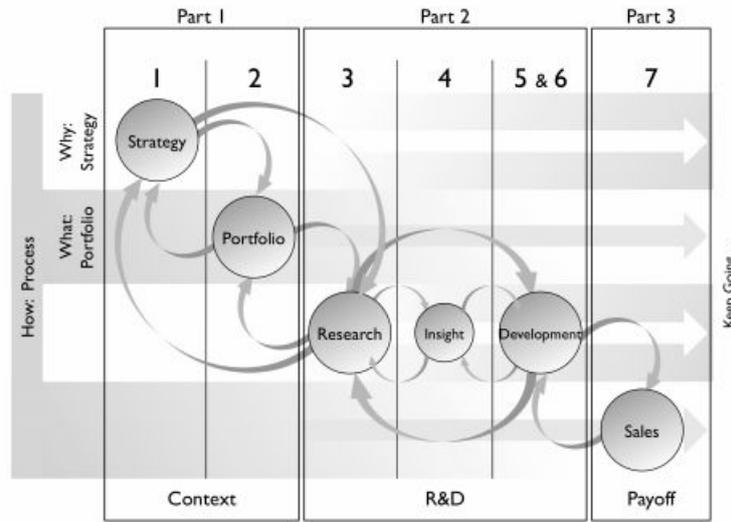


Figure 3.2: *Three parts in the innovation process Context (input), R&D (process), and the Sales Payoff (output) [31].*

approach[22][42], technology watch [17][43], project management, team-building and open innovation [24][13]. In spite of the differences, each of these approaches have in purpose and application, these tools have a structure that allows them to be applied in different contexts, either in manufacturing or service companies, big or small [7].

In industrial contexts, IM tools need to reach certain requirements in order to be as beneficial as possible. Some of the crucial principles and characteristics listed in scholarly works are: simple in concept and use; based on an objective best-practice model; be well structured; not mechanistic or prescriptive; flexible; accessible; standardized; have a clear and consistent terminology; result in quantifiable improvements and support communication [6][23][28][34].

Concerning the application of IM tools in firms, it is very common to wonder why certain tools have worked in some firms and failed in other. What are the conditions that determine the suitability of a certain tool in one firm and not to the others? This is a question about how a certain tool is exploited in firms, and has nothing to do with the complexity of the tool. In fact, the conditions required when using all the tools are: commitment, understanding and willingness both from managing bodies and direct employees; training and communication; and a necessary period of adaptation for the company to make a correct use of the tool [7]. Moreover, tools need to be used continuously, systematically and independent on the presence of certain individuals (experts) in the company [28][29]. Hence, from managers' point of view, IM tools should be considered as "a capital in hands of the company, a resource, as any other raw material, machine or skill" [7].

Table 3.1 in the next page provides us the most common and useful IM tools. With all the information about the tools' purpose, the main type of innovation that can be obtained with the exploitation, their relation with the technology life cycle and the people needed for their correct use, companies can choose the most suitable ones for them to succeed.

“The main goal of IM tools is to change the business environment, in other words, to induce cultural and organizational change”. The reason that explains why just the tools in this table (and not others) are considered as IM tools is that they can better serve this purpose [7].

In spite of the presence of multiple IM tools that support the management of innovation in companies, IM cannot be simply understood as the use of some techniques included in a toolbox. Managing innovation is a complex task, which requires the commitment from the managers and the consideration of both internal and external factors to the company. “Tools are just an aid in order to face this challenging task”. Because of the constraints and constantly changing in firms, it takes time for IM tools to be established within the company [7].

These IM tools are not developed with the expectation to convert a non-innovative company to an innovative one. They are implemented to enhance the continuous and systematic application of the routines (scan, focus, resource, implement and learn), which in turn will lead to the innovative advantages in firms. Therefore we need to have a clear mindset of which tools are useful for which goals (routines) [7]. Table 3.2 below is intended to give the relation between the routines and IM tools, which provides us the comprehensive method of how to manage innovation in the whole innovation process.

IM Tools Routines	Audits	Knowledge Manag.	Lead user	Technology Watch	Technology Foresight	Creativity
SCAN						
FOCUS						
RESOURCE						
IMPLEMENT						
LEARN						

Table 3.2: *Relation between routines and IM tools [7]*

IM Tool Major features of the tool	Audit	Knowledge Management	Innovation Value Chain (open innovation)	Lead user	Technology Watch	Technology Foresight	Creativity
What is it intended to?	Evaluation of core competences	Keep track of the relevant information within the company	Tech. Exploration Tech. Exploitation Idea generation	Develop needs that are ahead of the market	Continuous awareness Build absorptive capacity	Define the future strategic orientation	Problem-solving
For which type of innovation?	Organizational	Organizational Incremental	Incremental Radical	Radical	Incremental Radical	Incremental Radical	Incremental
When do you use this tool in the technology life cycle?	Emergency Growth Maturity Decline	Emergency Growth Maturity Decline	Emergency Growth Maturity Decline	Before emergency	Emergency Growth Maturity Decline	Emergency Growth Maturity Decline	Maturity
Who are the people involved?	Managers only (90°) All staff (360°) All staff, customers and suppliers (720°)	All staff	OPEN (all staff, customers, suppliers, research centres, NGOs, public servants, etc)	Users	Internal employees	Experts	Internal employees

Table 3.1: *IM tools, their purposes and relation with technology life cycle [7]*

* NGO: non governmental organization.

3.5 Assessment tools

Corporations are willing to manage the strategy of their company in an innovative way. However the question is how to manage innovation in corporations on a systematic way? How would it be possible for enterprises to manage it without the required tools? How can an appointed Chief Innovation Director know if his/her company is innovation ready? In order to enhance the innovativeness of corporations, there is a need for evaluating their knowledge, skills and capability at first, identifying weaknesses and find out the gaps that exist in the organization. In spite of that all companies are challenged to achieve competitive advantage and be at the leading edge. There is a major unconsciousness despite after all on how to achieve it.

IRS is one assessment tool which will be presented here, and can be used as an innovation assessment tool in the companies. Organizations need to measure their innovation capability in different areas such as leadership, ambition, organization, collaboration etc. Once companies are prepared to measure their innovation ability and be evaluated, then the necessary information will be available for managing innovation in the corporation.

The next chapter will present the software IRS and its benefit, the needed introduction for implementing it, where it can be applied, under which circumstances and to whom should it be distributed.

Chapter 4

The Assessment Software

4.1 Innovation Readiness Scan (IRS)

Innovation Ready Scan is a software program made by Logica¹, in collaboration with INSEAD. The goal of Innovation-Ready Scan is to assess how mature the organizations are regarded their skills and capabilities in relation to innovation.

The software contains four different dimensions: *Leadership & Ambition*, *Organization & Collaboration*, *Implementation & Measurement* and *People & Culture*. Each dimension contains eight questions. The questions are intended to be used in different type of companies and different level of employees should be able to participate and answer them. Each dimension is also divided into four different categories, which just appear in the result. That means every dimension includes eight questions that measure four different perspectives.

The software provides a scan through the innovation ability of the company. It's essential to distribute IRS to different level of employees at the company, so as to be able to indicate the highest level of employee where innovation is addressed to.

The result from the IRS appears in five different spider graphs. The spider graphs help us to identify the strengths and weaknesses through the mentioned dimensions in the company. By identifying the weaknesses in the particular areas, the program proposes which area needs to be improved. The first spider graph shows up the Overall Innovation Score from the studied area, which describes the average performance of the organization across the following four dimensions: *Leadership & Ambition*, *Organization & Collaboration*, *Implementation & Measurement* and *People & Culture*. The other graphs follow the same rule and point out the strengths and weaknesses through the different parts that constitute each dimension.

4.1.1 Leadership and Ambition

The first dimension in the survey is *Leadership & Ambition*. The leadership of the company is the first and highest level where innovation should be addressed. This part will find out if there is someone in the board of directors who is responsible for innovation. At the same time innovation is something that everyone in organization

¹Sweden's largest IT-service company

should be involved in. Likewise by collaborating with customers, suppliers, competitors, other firms etc, they can base their strategy on Open Innovation. The area will measure the company/employees capability in these four categories: *belief, drive, strategy and communication*.

Companies should place innovation as a core foundation of their mission. IRS put the emphasis on the companies/employees belief in innovation. There is always a “window” through which companies are viewing their problems. And this “window” frames problems in term of their beliefs. In this manner company’s or employee’s way of thinking influence their reactions and solutions for the problems they have in the company, and all these factors affect the process of decision making. A strong belief in innovation is a key factor for companies to be more innovative. Therefore the degree of employees’ believe in innovation reflects directly how the employees act in the company and how these behaviors may have an impact on the organization’s innovativeness.

One of categories that the software has emphasized is “drive”, which originates from the highest level of organizations, thus decision making occurs in this level. In any case the CEO’s commitment in innovation gives a strong empowerment to the rest of employees. Enterprises need clear goals and the decision making process has to be structured and not just based on hopeful visions. For achieving this, an innovation strategy is required.

A smart organization needs to define their own strategy in a proactive manner, that is, before different types of crisis situations may happen. Each department in the organization needs to translate all these innovation strategies into particular goals and make an action plan for them. The last category is about communication, that plays a vital role in transferring information inside and outside of the company. In order to create consciousness among all employees, everyone in the company should know about all innovative projects that the organization is involved in, a clear communication is needed. Communication with external partners is important as well. Companies have to inform their customers, suppliers and other firms about their innovativeness, and this happens in the case that the company speak out at conferences, in the news or by crowd sourcing about their innovative projects, their visions and tell the world how innovative they are.

4.1.2 Organization and Collaboration

Organization & Collaboration is the second area of the software which will screen the organization’s structure and analyze how the company is organized. In this dimension, the IRS has lift up different essential factors that the company should be aware of, for instance if the company has any department for orchestrating innovation, if the company collaborates with others and the extent of involvement from the external partners in innovation. The result appears in the spider graph divided in four key factors: *Organization, Participation, Internal Collaboration and External Collaboration*.

Innovation is a process that starts by generating new ideas, identifying and prioritizing those ideas with most feasibility and finally commercializing them. Hence a smart

organization strategy needs to allow the company a secure way to the target.

Involving all employees in the organization is an important point. Companies can have as many inventions or new ideas as the number of employees working there. On the other hand employees can not just pursue their new ideas without available required time and resources. Therefore gathering new ideas and participation of all employees due to approaching a successful innovation is the company's responsibility, by providing the time and resources needed.

Open Innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the market for external use of innovation respectively[10]. Internal collaboration demands a strategy based on Open Innovation inside of the organization. Internal Collaboration is required in order to get access to the existing knowledge, various projects and all decisions made in the company. Spreading the expert's knowledge and cooperation between departments can certainly expand the organization's performance and enhance innovativeness in the company. The advantage of Internal Collaboration does not only target the company but also the employee's personal development is affected very positively.

There are a number of factors which affect companies in choosing external partners. It is very obvious that a company cannot compete alone as effective as when they collaborate with other organizations, either in a national or international fields. Companies should find out right partners with right skills and capability in order to complement each other. Collaboration help them to indicate different perspectives when they are trying to find different solutions for their problems. Collaboration with external partners, enables the access to other firms' experience and knowledge, thus increases the speed of the creation of products, processes or services to the market.

4.1.3 Implementation and Measurement

Implementation & Measurement is the third area in the survey which evaluates the existence of an innovation strategy in the company. IRS measures the company's capability in translating and commercializing their goals. This part of the survey highlights the importance of innovation, and looks how innovative the company is in comparison to their competitors. IRS evaluates if the company has the required tools for measuring their innovativity, and the way they implement their new ideas. Moreover these factors, the financial contribution and the level of budget they invest in innovation, in comparison with the company's innovation ambition are taken up here as well. The result from this part is shown in these four factors: *Implementation, Measurement & Metrics, External Benchmarking and Budget*.

The best decisions or the most creative ideas are useless if there is not any feasible plan for implementation. The spider graph helps the company in the way they can measure their innovativeness, and provide suggestions on which areas they need to improve or change their management, capabilities or ambitions.

Benchmarking is a process of comparing, for instance companies business performance or best practices to other industries and etc. In this case IRS look if the company

benchmarks their innovativity to other companies and if they have any idea about their performance in comparison to other companies.

4.1.4 People and Culture

People & Culture is the fourth and last dimension that the survey screens. The culture of employees/companies is very important dimension of IRS. This part studies the behaviors of the organization in sharing knowledge, taking risks and the attitude of employees in understanding the importance of innovation. The result appears in spider graph with the same rule as described in previous dimensions. The key factors from this part are: *Culture, Career and Reward, Attitude* and *Training*.

Corporate culture includes the total value of all norms, beliefs, strategies, way of planning, behavior that depends on their knowledge, experience etc. The culture that exists in a company has deep roots. Employees attitudes depends on the existing culture within the company. A company can not create a rich innovative culture overnight, but the culture of innovation has to be injected in to the companies/employees foundation. The Culture of innovativity should be one of the foundations of the company, not something to inject in crisis situations. There is no culture that can manage these unpredictable situations.

Employees contribution to the innovative projects should be rewarded. Employees should have more time for personal project development and have the opportunity for being involved in projects that they are more interested in. The most innovative companies in the world, for instance Google; provide their employees approximately 10-20% of their work time to spend on projects that they are more engaged in. The reward makes them more motivated and the "Time off" for personal development give them capability of a fresh mind for being more creative during the project.

A radical change in a product, process or a service includes many uncertainties. In this point it's essential to mention that failure is a part of innovation. Acceptance of failure in the projects and talk about it openly, have a feedback are different points that can help the company to approach success from their failure.

A company should provide learning and education to acquire competitive advantage among others. The learning is a process which needs a management of knowledge network. A company has to classify the employees competences, and then connect them into the internal networks such as education, training and project. After all the company should create structures and routines for communication and sharing. Of key importance in sharing different expertise, connection to the external environment is needed, this method of detecting information from the outside is calls Boundary Spanners. The same process can happen if a small group in the company connects into the larger network but internally which calls Information brokers. In some cases the knowledge or expertise are passed to the network just in necessary situation, this method can be used when a company would not waste lots of time and money to keep their expertise within the network continuously.

Chapter 5

Method and data

Our method here is based on all the data base from the survey of 221 companies worldwide in 2009. The objectives of our analysis of this data base is to answer the following research questions

- What does every sector/industry have for behaviors to become more innovative? Which industries are more innovative than others? Which type of innovation exists in a certain sector/industry?
- Are large companies more innovative than small companies? Does the size of a company have any meaning in innovation management?
- What are the factors that helps measuring a certain company's innovativeness?
- Can the result of this survey prove the theory developed in the "conceptual framework"?
- What can companies do in order to increase their capacity for innovation?

For this reason, we divided our analysis in three parts: the sector analysis, the analysis of companies' size and finally the comparison analysis of the data base with the conceptual framework, as developed in chapter 23. Our survey includes about 95 questions and in order to facilitate the analysis, we divided them into four areas dependent on what the questions are focused on:

- Company characteristics
- Innovation factors
- Internal factors
- External factors

For every question, we have counted the number of companies which have chosen a certain alternative of answers. By choosing the suitable questions and create their graph in Matlab, we could see the most crucial characteristics in innovation, innovation management and innovation measurements.

For the analysis of different sectors, we have chosen seven industries with the largest numbers of companies which had participated in this survey to get the most relevant result. In order to determine the most common characteristics of each industry, we have combined the data from two questions or more to get the tables and relations which are shown in next section.

By comparing the data from companies' sizes and their revenues, their profits and even their special characteristics concerning innovation management, we could suggest companies of different size with suitable solutions in the way they manage innovation and make profit.

In order to make it easier for the readers to follow the analysis of innovation theory, this part of the analysis is divided into the four previously mentioned areas, namely company characteristic, innovation factors, internal factors and external factors.

Chapter 6

Analysis and Results

As explained above, the results section is divided into three parts: sector analysis, analysis with respect to the firms' size and proof of innovation theory. First of all, the reader should be aware of the popularity of innovation in organizations, which are shown in the following graph.

Innovation is deeply embedded in the culture of our organization
(result from 192 companies which answered)

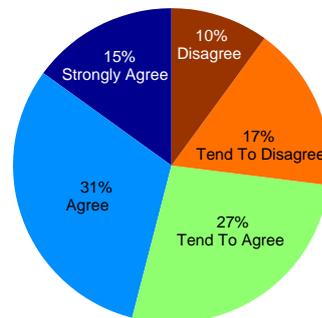


Figure 6.1: *Innovation is deeply embedded in the culture of organizations.*

The graph shows that the proportion of companies which have in general agreed that innovation is deeply embedded in the culture of their organization is quite large, i.e 73% totally. A common question that has been raised to many companies is whether they are able to measure their success in innovation. This issue covers a large part of the analysis and the graph below may give an interesting impression to the readers.

Our organisation does a good job of measuring how successful our innovation efforts are
(result from 190 companies which answered)

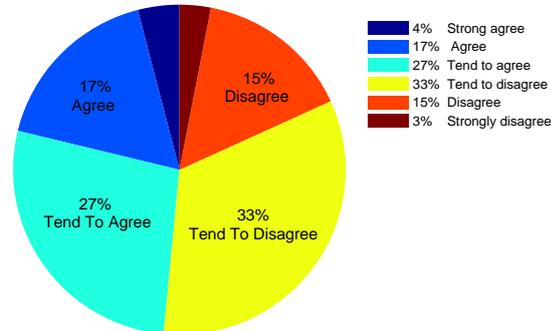


Figure 6.2: *How good organizations do in measuring the success in their innovation efforts.*

6.1 Sector analysis

As mentioned above, we have taken the seven most common industries/sectors into our analysis:

1. Technology
2. Transport, mail & logistics
3. Manufacturing
4. Telecoms
5. Public sectors
6. Energy & utilities
7. Financial services

Which industries/sectors of these are in general more innovative than others? The table below helps provide the answer to this question, by combining the data from the question qId_320 about different sectors and the question qId_235 about the different sectors' innovativeness with six answer alternatives, namely "strongly agree", "agree", "tend to agree", "disagree" and "strongly disagree"¹:

¹For the link between the qId and their formulation please check Appendix AA

qId_320\qId_235	Strongly agree	Agree	Tend to agree	Tend to disagree	Disagree	Strongly disagree
Technology	5	1	0	1	0	0
Manufacturing	3	4	2	2	2	1
Transport, mail & logistics	0	2	4	3	5	2
Telecoms	7	6	3	3	0	0
Public sectors	0	2	6	6	3	1
Energy & utilities	4	1	8	12	7	3
Financial services	2	6	8	14	10	3

Table 6.1: Which industries/sectors are in general more innovative than others.

The table shows the following results:

- In the *technology* sector, 71.4% “strongly agree” and 14.3% “agree” that their industry is more innovative than others; only 14.3% “tend to disagree”. This means that about 86% of companies have the tendency to agree and about 14% have the opposite tendency.
- In the *manufacturing* sector, there are totally 64% of companies which “strongly agree”, “agree” and “tend to agree”, while 36% choose the “disagree”-alternatives.
- Totally 37.5% av companies belonging to the *transport, mail & logistic* sector have the tendency to agree and 62.5% have chosen the disagree- alternatives.
- In the *telecoms* sector, about 84% have agreed that their industry are more innovative than others while only 16% “tend to disagree”.
- The proportion of companies which have the assent tendency in *public* sector is 44% totally while the proportion with the opposite tendency is 56%.
- Of all the companies in *energy & utilities* sector, 37% have chosen the agree-alternatives while 63% have in general disagree.
- Finally, in the *financial services* sector, totally 37% of companies have the assent tendency and 63% have the opposite tendency.

Dependently on which industry a company belongs to, the company’s innovation initiatives may be specific to business units/country organization rather than international. The following table is a result from the comparison of question qId_320 and question qId_283.

qId_320\qId_283	Strongly agree	Agree	Tend to agree	Tend to disagree	Disagree	Strongly disagree
Technology	0	0	1	3	2	1
Manufacturing	2	2	3	3	3	0
Transport, mail & logistics	1	5	4	4	2	0
Telecoms	2	8	3	2	1	2
Public sectors	3	5	5	2	2	0
Energy & utilities	4	12	10	5	3	0
Financial services	4	14	10	5	7	1

Table 6.2: *The innovation initiatives of different sectors are specific to business units/ country organization rather than international.*

The results obtained from this table is summarized on the table below

qId_320\qId_283	Tendency to agree	Tendency to disagree
Technology	12.5%	87.5%
Manufacturing	54%	46%
Transport, mail & logistics	62.5%	37.5%
Telecoms	72%	28%
Public sectors	76.5%	23.5%
Energy & utilities	76.5%	23.5%
Financial services	68%	32%

Table 6.3: *The more general results obtained from table 6.2*

Different industries/sectors have different priorities in innovation and therefore may focus on certain types of innovation. An industry/sector may have one or more types of innovation. The table below helps pointing out which kinds of innovation are available in which industries.

Product/service innovation

qId_320\qId_286	Strongly agree	Agree	Tend to agree	Tend to disagree	Disagree	Strongly disagree
Technology	1	6	0	0	0	0
Manufacturing	2	3	5	2	1	0
Transport, mail & logistics	0	4	5	4	3	0
Telecoms	0	10	2	5	1	0
Public sectors	0	1	4	6	4	2
Energy & utilities	2	2	11	10	8	1
Financial services	3	7	16	9	6	0

Table 6.4: *Which industries more likely have product/service innovation.*

Table 6.4 above gives us more general results:

- Companies from the *technology* sector 100% have agreed that their industry have product/service innovation.
- In the *manufacturing* sector, 77% have in general agreed and only 23% have disagreed.
- In the *transport, mail & logistics* sector, 56% have made some choices of agree-tendency and 44% have made the choices of disagree-tendency.
- About 67% in *telecoms* industry have in general agreed that they have product/service innovation while 33% have disagreed.
- Totally 29% of companies in the *public* sector have made some choice of agree-tendency while 71% has disagreed in general.
- In the *energy and utilities* sector, 44% have the tendency to agree and 56% have the opposite tendency.
- The *financial services* sector have in general agreed with 65% and disagreed with 35%.

Technological process innovation

qId_320\qId_287	Strongly agree	Agree	Tend to agree	Tend to disagree	Disagree	Strongly disagree
Technology	0	1	2	4	0	0
Manufacturing	2	3	3	4	1	0
Transport, mail & logistics	0	0	5	9	2	0
Telecoms	0	1	7	9	1	0
Public sectors	0	2	2	8	3	2
Energy & utilities	0	2	11	11	9	1
Financial services	1	7	12	13	5	3

Table 6.5: Which industries are more focused on technological process innovation

A more comprehensive result of the table 6.5 is shown in the table below.

qId_320\qId_287	Tendency to agree	Tendency to disagree
Technology	43%	57%
Manufacturing	61.5%	38.5%
Transport, mail & logistics	31%	68%
Telecoms	44%	55%
Public sectors	23.5%	76.5%
Energy & utilities	38%	62%
Financial services	49%	51%

Table 6.6: *The more general results from table 6.5*

Organizational process innovation

qId_320\qId_288	Strongly agree	Agree	Tend to agree	Tend to disagree	Disagree	Strongly disagree
Technology	0	2	1	3	1	0
Manufacturing	1	1	5	3	3	4
Transport, mail & logistics	0	0	7	4	5	0
Telecoms	0	1	5	8	3	1
Public sectors	0	2	2	6	4	3
Energy & utilities	0	4	6	18	6	0
Financial services	0	6	9	17	8	1

Table 6.7: *Which industries are more focused on organizational process innovation.*

In the same way, we can get the following table that gives more general results of table 6.7

qId_320\qId_288	Tendency to agree	Tendency to disagree
Technology	43%	57%
Manufacturing	41%	59%
Transport, mail & logistics	44%	56%
Telecoms	33%	67%
Public sectors	24%	76%
Energy & utilities	29%	71%
Financial services	37%	63%

Table 6.8: *The more general results from table 6.7*

Innovation in new business model

qId_320\qId_289	Strongly agree	Agree	Tend to agree	Tend to disagree	Disagree	Strongly disagree
Technology	0	2	4	0	0	1
Manufacturing	1	1	3	4	2	2
Transport, mail & logistics	0	3	2	5	5	1
Telecoms	0	1	5	7	3	2
Public sectors	0	0	2	8	4	3
Energy & utilities	0	2	11	9	4	3
Financial services	0	5	14	14	7	1

Table 6.9: *Which industries are more focused on the innovation in new business model.*

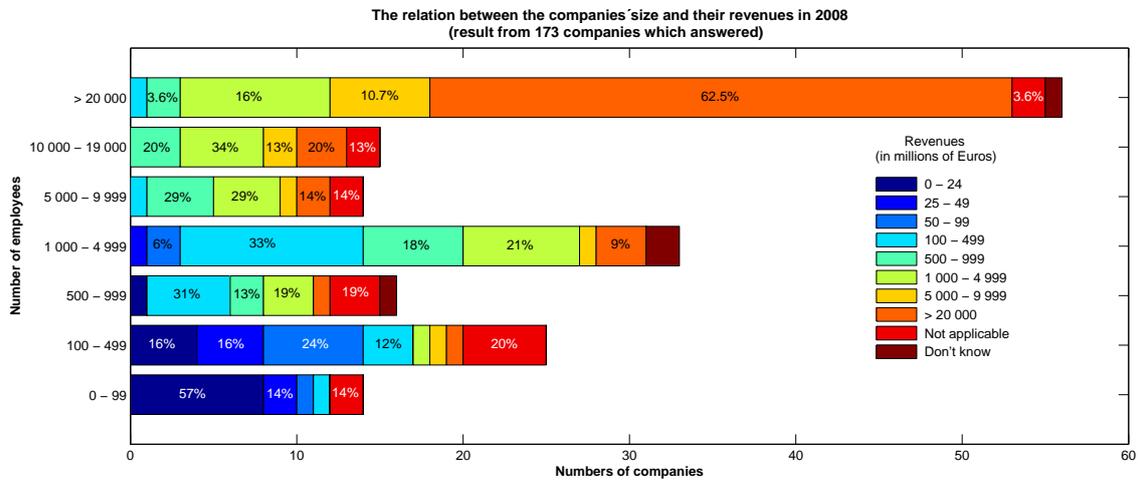
Finally, more comprehensive results of table 6.9 are shown below

qId_320\qId_289	Tendency to agree	Tendency to disagree
Technology	86%	14%
Manufacturing	38%	62%
Transport, mail & logistics	31%	69%
Telecoms	33%	67%
Public sectors	12%	88%
Energy & utilities	45%	55%
Financial services	46%	54%

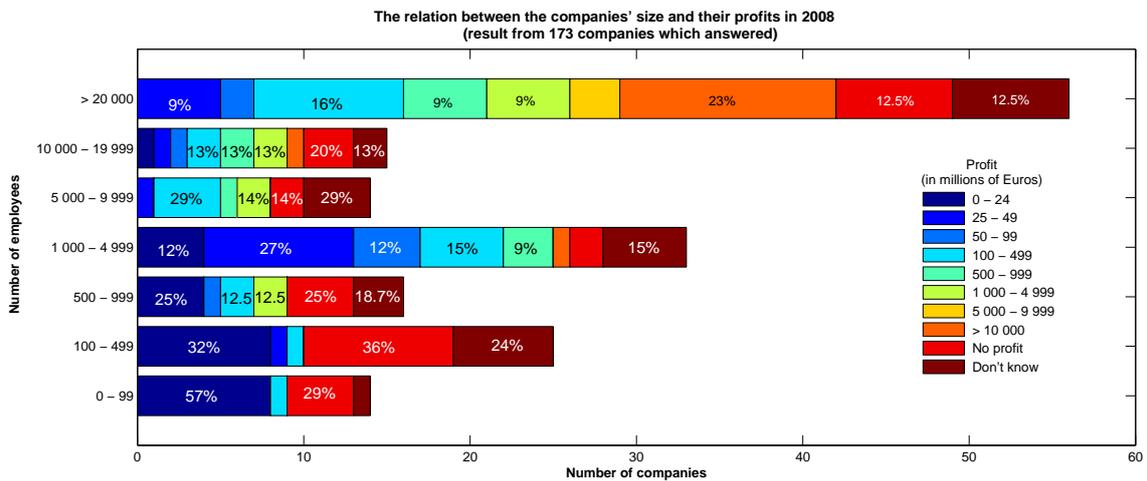
Table 6.10: *The more general results from table 6.9*

6.2 Analysis with respect to companies' size

The size of a company is usually supposed to be one of the decisive characters in creating its corporate and innovation strategy. This section begins with the following graph, which takes up the relation between a company' s size and its revenues respective profits.



(a) Different sizes with different revenue levels of companies in % (every staple of a certain company size corresponds to 100%)



(b) Different sizes with different profit levels of companies in % (every staple of a certain company size corresponds to 100%)

Does the size of a company have any influence in identifying partners to collaborate with? The combination of the questions qId_324 and qId_304 give rise to the following table and provide us the answer to this issue.

qId_324\qId_304	Tendency to agree that the organization have difficulty	Tendency to disagree that the organization have difficulty
0 - 99	29%	72%
100 - 499	24%	76%
500 - 999	30%	70%
1 000 - 4 999	33%	67%
5 000 - 9 999	43%	57%
10 000 - 19 000	47%	53%
> 20 000	32%	68%

Table 6.11: *Does the size of a company influence the difficulty in identifying partners to collaborate with? (The result of 175 companies which answered)*

6.3 Comparison analysis of the data base with existent innovation theories

- Company characteristics concerning IM

This section begins with the following graph that takes up the importance of diversity in teams in innovation projects.

Diversity (nationality, function, gender etc) in teams increases creativity and the success rate of innovation projects (result from 182 companies which answered)

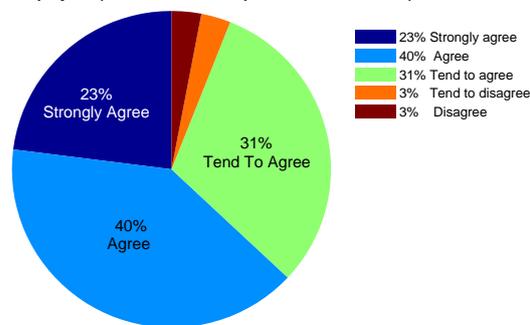


Figure 6.3: *The importance of diversity in teams in innovation projects.*

When 182 companies have answered to the question qId_275, whether they emphasize creative problem solving as one of their key criteria when recruiting staff, the result have shown that 68% have agreed in general and 32% have disagreed. In order to prove

the importance of this characteristic in the management of innovation, we combine this question with the question qId_323 concerning the companies different profit levels (in millions of Euro) . The result is shown in the following table.

qId_323\qId_275	Strongly Agree	Agree	Tend to agree	Tend to disagree	Disagree
No profit	17%	14%	13.7%	40%	40%
0 - 24	8%	17%	23.5%	11%	10%
25 - 49	25%	6%	17.6%	9%	0
50 - 99	8%	11%	4%	0	0
100 - 499	17%	17%	21.6%	9%	10%
500 - 999	0	11%	7.8%	9%	0
1 000 - 4 999	8%	9%	2%	9%	30%
5 000 - 9 999	0	6%	0	3%	0
> 10 000	17%	9%	9.8%	11%	10%

Table 6.12: *The relation between how companies emphasize creative problem solving when recruiting staff and the companies' profits.*

Because there are only 2 companies which have chosen “strongly disagree”, it’s not so relevant and necessary to take this answer alternative in the analysis.

Besides these two characters, there are many others factors which need to be considered here. By combining the questions qId_277 and qId_234, we may be able to find out whether the companies, that provide learning and education to employees, have more chances to succeed and become the leader in their own industry. The table below shows the general result of this comparison.

qId_277\qId_234	Tendency to agree	Tendency to disagree
Strongly agree	79%	21%
Agree	81.5%	18.5%
Tend to agree	59%	41%
Tend to disagree	59%	41%
Disagree	60%	40%

Table 6.13: *May providing learning and education to employees be one of the factors that helps organizations to become the leader in innovation in their own industry? (The result of 182 companies which answered)*

Only 6 companies have chosen the “strongly disagree” alternative when answering the question qId_277. For this reason, it is not so relevant to have this alternative in the result table.

In the same way, the combination of the questions qId_278 and qId_234 gives rise to the table below.

qId_278\qId_234	Tendency to agree	Tendency to disagree
Strongly agree	79%	21%
Agree	76%	24%
Tend to agree	73%	27%
Tend to disagree	52%	48%
Disagree	33%	67%

Table 6.14: *Is the success in sharing best practices in organizations an decisive factor that helps them become the leader in innovation in their industry (the result of 182 companies which answered)*

For the same reason as above, i.e there are only 2 companies which answered to “strongly disagree” in qId_278 (both companies have the tendency to disagree that they are the leader in innovation in their industry), this result table didn’t get this alternative into consideration.

Concerning the question qId_280, totally 64% of 182 companies have answered that their organization provides resources (time, fund etc) to employees to pursue innovation ideas/projects. The same issue here is whether this company character/activity can help the organizations to become a leader in innovation in their industry. The table below is a combination of this question and the question qId_234.

qId_280\qId_234	Tendency to agree	Tendency to disagree
Strongly agree	86%	14%
Agree	84%	16%
Tend to agree	71%	29%
Tend to disagree	50%	50%
Disagree	53%	47%
Strongly disagree	40%	60%

Table 6.15: *Can the character of providing resources to employees to pursue innovation ideas/projects be an important factor that make it possible for companies to be a leader in innovation in their industry? (the result of 182 companies that answered)*

Note that there were only 5 companies which answered to “strongly disagree” in qId_280, whereof 2 companies “tend to agree” that their organization is a leader in innovation and 3 companies “disagree” about that. This means that the resulting proportions of this last alternative may become quite different if more companies would have participated in the survey.

The question qId_281 under the combination with qId_234 takes up the necessity of a process for managing and mobilizing everyone in the organization to come up with innovative ideas. Can this character be one of the determining factors in the success of an organization? Following is the result table that means more than thousand words

qId_281\qId_234	Tendency to agree	Tendency to disagree
Strongly agree	89%	11%
Agree	83%	17%
Tend to agree	67%	33%
Tend to disagree	58%	42%
Disagree	58%	42%
Strongly disagree	29%	71%

Table 6.16: *The combination of the questions qId_281 and qId_234 (the result of 182 companies which answered)*

And finally the question qId_282 is combined with qId_234 to prove whether an organization with good metrics for evaluating the success of their innovation projects has better chances to become the leader in innovation in their industry. The result of 182 companies which answered is shown below.

qId_282\qId_234	Tendency to agree	Tendency to disagree
Strongly agree	83%	17%
Agree	87%	13%
Tend to agree	79%	21%
Tend to disagree	55%	45%
Disagree	62.5%	37.5%
Strongly disagree	43%	57%

Table 6.17: *Has an organization with good metrics for evaluating the success of their innovation projects better chances to become the leader in innovation in their industry? (The result of 182 companies which answered).*

Moreover the data-scan has even taken into consideration the other characters such as the diversity in term of nationality or the gender balance in the organization. About 58% of 190 companies, which have answered to the question qId_238, have in general agreed that their employees are divers in term of nationality. Of the 190 companies, which have answered to the question qId_239, 54% have ascertained that their organization have a good gender balance at all levels of the organization.

Besides all the above properties that companies can change or affect in their organizational management, the importance of the collaboration with external partners is taken up in the graphs below.

Innovation projects that include significant collaboration with external partners are more successful
(result from 180 companies which answered)

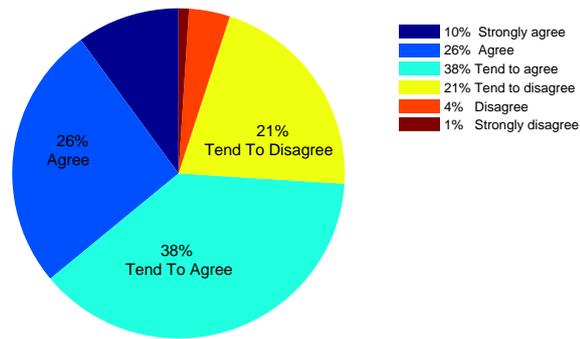


Figure 6.4: The pie chart of all answer alternatives to the question *qId_298*

Collaborative processes with external partners is an important enabler of innovation
(result from 180 companies which answered)

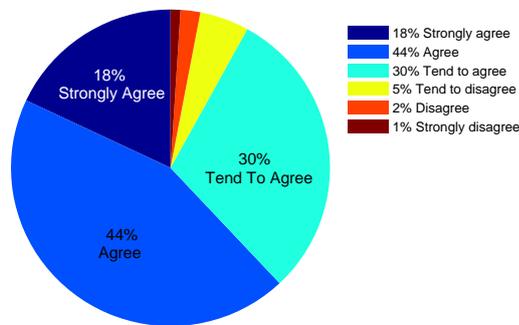


Figure 6.5: The pie chart of all answer alternatives to the question *qId_302*

How to collaborate with external partners to create value and benefit is also an issue that should be discussed. The following graph is a result of the question *qId_301*, that takes up one of many aspects concerning the external collaboration.

A culture of sharing within an organization makes it easier to collaborate with external partners
(result from 180 companies which answered)

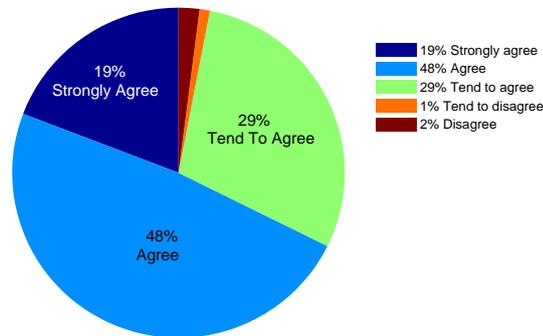


Figure 6.6: The pie chart of all answer alternatives to the question qId_301

- Innovation factors

Innovation factors are considered to be the most relevant current factors that every company should update and take into consideration when managing innovation. Thus, the graph below is interesting to take a look at.

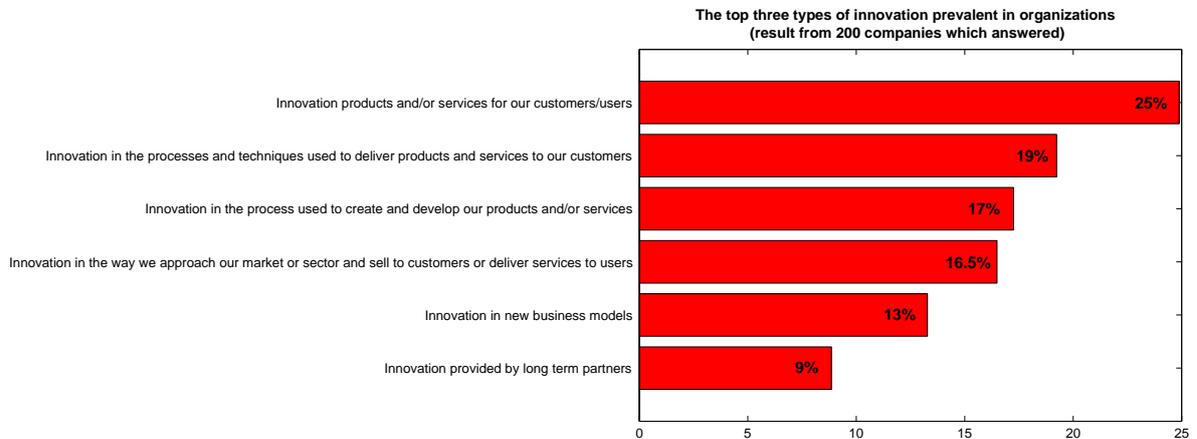


Figure 6.7: The histogram for the question qId_221.

There are many reasons for a company to invest in some innovation projects and the questions qId_246, qId_247 raise up the most common reasons that promotes many organizations to choose to invest in innovation. According to the answers (from 189

companies) of the question qId_246, totally 91.5% have the tendency to agree that investing in innovation is important to survive a recession. At the same time, totally 95% of 189 companies when answering to the question qId_247 have in general agreed that investing in innovation is important to increase profitability.

- Internal factors

In IM, internal factors are very important factors that should be taken into account when making new decision in innovation strategy.

Accordingly the management/corporate priorities of an organization play an important role in IM. The graph below shows the current top corporate priorities of an organization

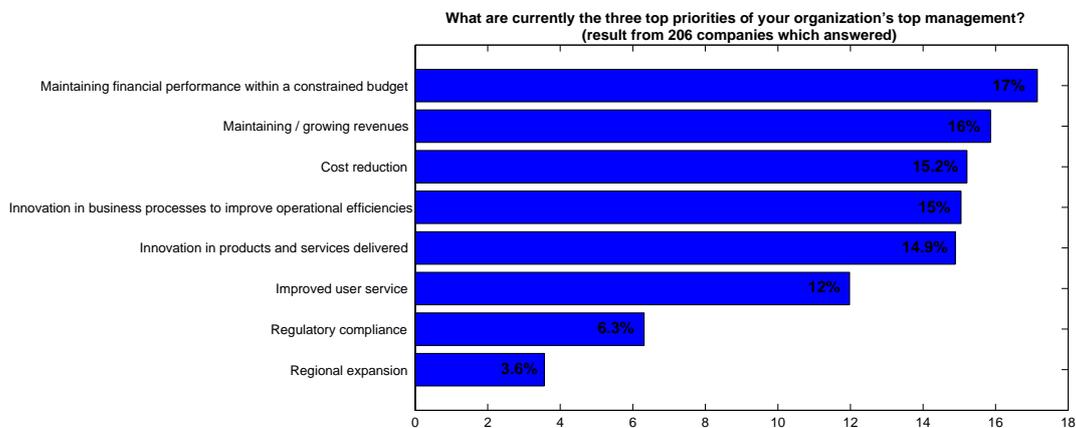


Figure 6.8: *The histogram for the question qId_222.*

The existence of an innovation manager in an organization is also considered to be one of many important internal factors in IM. When combining the questions qId_260 and qId_323, the result shows that 25% of 125 companies, which did not have a Chief Innovation Officer or equivalent, did not have any profit in 2008 while the proportion of the 64 companies which have a Chief Innovation Officer but did not have any profit in the same year was only 16%.

When looking at the question qId_292, the top ways the organizations reward employees for successful innovation projects can be shown in the order of importance:

1. Non-financial rewards (for example in organization's newsletter etc.)
2. Greater level of responsibility
3. Career promotions
4. Financial rewards

And finally the internal factors that block the success of organizations' innovation efforts can be shown in the following graph.

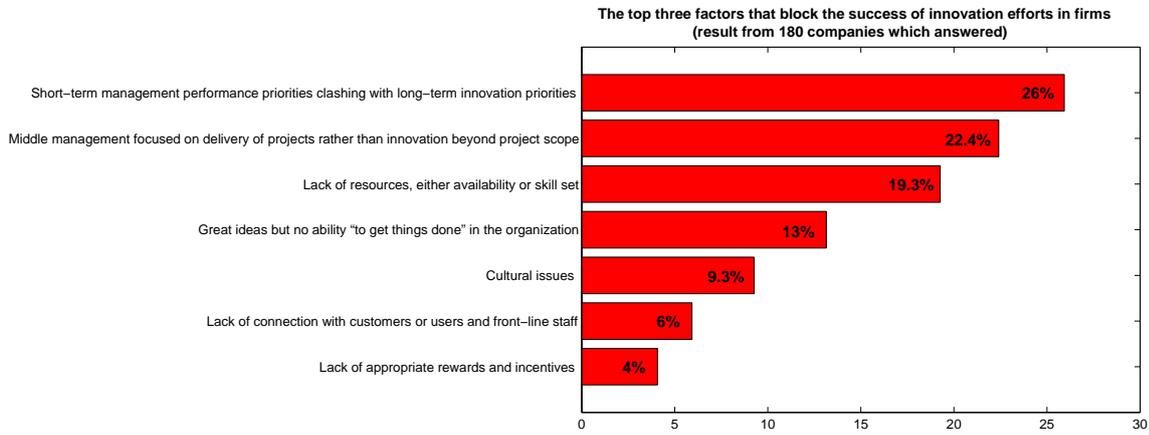


Figure 6.9: *The histogram of the question qId_294*

- External factors

Finally, the external factors also have considerable influences on the decision making and the success of innovation. The graph below shows the top macro trends that have the most impact on the performance of organizations.

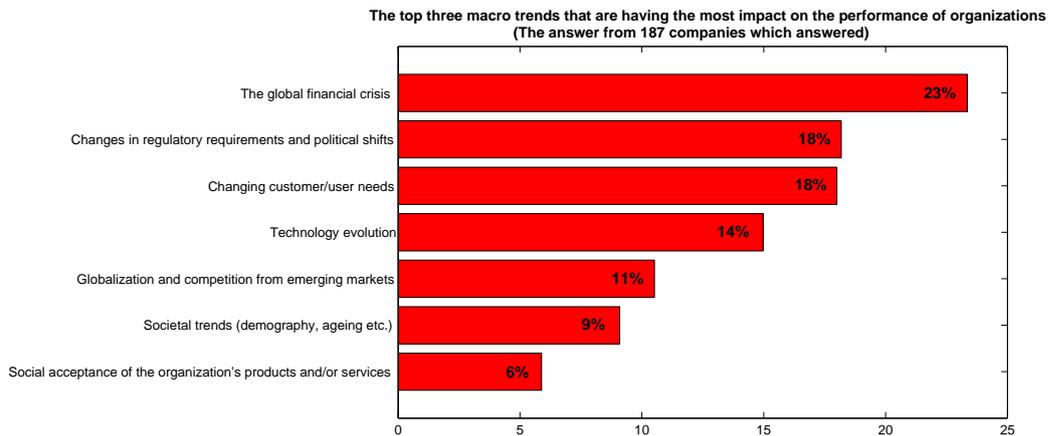


Figure 6.10: *The histogram of the question qId_251*

The question qId_256 takes up the most important developments in the external environment that are monitored by organizations when developing their innovation strategy. The following histogram ends this section as well as the result chapter.

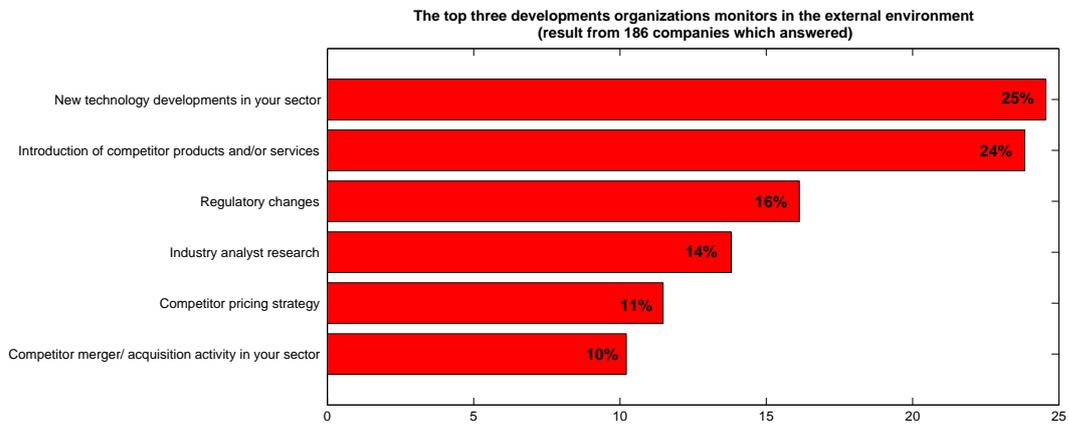


Figure 6.11: *The histogram of the question qId_256*

Chapter 7

Discussion and conclusion

The role innovation plays in the development of organizations is undeniable. The fact that 73% of 192 companies has ascertained the deep embeddedness of innovation in the culture of their organization is no longer something surprising. The figure 6.1 is more than a proof for the great importance and influence of innovation in organizations. The statement that companies need to measure their capability for innovation is not either something arguable. The question here is how organizations do to measure their success in innovation efforts. Figure 6.2 shows that only 48% of 190 companies thought that they have done a good job in measuring their innovativeness. This is one of many reasons that emphasize the value of the software IRS as well as the meaning of the whole thesis.

7.1 Discussion

7.1.1 Sector analysis

According to the results from table 6.1, the three most innovative industries/sectors in 2008 can be listed in the following decreasing order:

1. *Technology* sector.
2. *Telecoms* sector.
3. *Manufacturing* sector.

The *public* sector was not so innovative, since only 44% of the companies in this sector have the tendency to agree that their sector is more innovative than others including the fact that most of them have chosen the alternatives “tend to agree”. It’s understandable when the result has pointed out that *energy & utility* sector and *financial services* sector were the least innovative sectors. The year 2008 was considered to be a year of drastic global financial crisis and uncertainty in the oil and energy market[41].

Concerning the question whether a certain industry is specific to business unit/country organization rather than international, the table 6.3 shows that the following sectors are more specific to business units/country organization:

- *Public* sectors

- *Energy & utility*
- *Telecoms*
- *Financial services*
- *Transport, mail & logistic*

Technology is the only sector that is more specific to international. And the *manufacturing* sector is shown to be specific to both business units/country organization and international.

The knowledge about what every sector is specific to may help companies in a certain industry to make the right decisions in their innovation strategy and identify partners to collaborate with.

As mentioned above, by knowing which types of innovation every industry/sector usually focuses on, it may help companies in a certain industry to have the right direction in their organizational and corporate management and even in their collaboration with external partners.

According to the results from the tables 6.4, 6.6, 6.8 and 6.10, every sector can be characterized by some specific types of innovation (among product/service innovation, technological process innovation, organizational process innovation and innovation in the business model):

- The *technology* sector focuses mostly on product/service innovation and innovation in new business model. It may happen that some companies in this industry also have technological or organizational process innovation, but this proportion is very small with respect to the proportion of companies, which have the two first mentioned types.
- The *manufacturing* industry is most specific to product/service innovation and a small part of companies in this industry may also have organizational process innovation.
- Again, product/service innovation takes the major role in the *telecoms* sector while technological process innovation only emerges in a small part of companies in this industry.
- The *public* sectors are not focused on any certain kind of innovation. Product/service innovation and technological respective organizational process innovation, each may exist in companies of this industry with small proportions.
- The *energy & utilities* industry have both product/service innovation and innovation in new business model, but none of these two types can be considered to be the major type of this sector.
- In *financial services* sector, product/service innovation one more time constitutes the most major type of innovation. Moreover there are small parts of companies in this sector, which also have technological process innovation and innovation in new business model.

Briefly, product/service innovation is the most common type of innovation that organization/industries want to invest in.

Now when the readers have understood the link between different sectors and innovation factors, it may be interesting to go on with the discussion about innovation management and companies' size.

7.1.2 Analysis with respect to companies' size

When comparing the revenues of companies with different sizes in figure 6.3a, it indicates a substantial relationship between a company's size and its yield. Large companies have the tendency to get a higher level of revenue than small companies. The readers may see in the graph that the smallest companies have the lowest level of revenue at most and a small company can not get how high revenues as possible. Thus, the revenue of an organization is somehow proportional to its size. However, it doesn't mean that a large company won't get a low level of return; an organization of large size may have equally high risk of getting low revenue as a small company, if the organization doesn't know how to work in an innovative way to benefit. For each staple of size, there is a quite large part of companies whose revenues was not applicable. This may be an issue which many leaders and managers in organizations in 2008 have worked hard to find an answer to

While the graph 6.3a shows a significant relationship between the company's size and its return, the graph 6.3b awakens many arguable questions. It shows that many companies, large as well as small, got the lowest levels of profit at most. One may see some small proportions of higher profits exist in companies of the sizes larger than 5 000 employees, but significantly large proportions of the companies with different sizes did not have any profit in 2008. Only companies with more than 20 000 employees got in general higher levels of profit compared to the smaller companies, but a large part of these largest companies did not have any profit in 2008 either. Briefly, there exists a slight proportionality between companies' size and their profits; this relation is more applicable to small firms while large firms may get any level of profit any time. It's remarkable in these two figures that many companies, which had high levels of revenue, had a low level of profit or did not get any profit at all. Firstly, the world economic crisis in 2008 may partially explain the unstable state of the organizations' profits with respect to their revenues and sizes. Secondly, the organizations' profits is heavily dependent on how systematically and effectively companies have worked. It's necessary to highlight that the profit of a company is rather related to how innovative the organization is than to its size. Therefore some assessment tools like IRS is considered to be necessary to help companies measure their innovativeness and even find out the existing barriers that every particular company is facing.

The company size is also a factor that influences the way companies identify partners to collaborate with. The table 6.11 shows that small companies may have little easier to identify their partners than large companies. A larger company may have more departments and maybe a wide range of products to handle with and therefore need to take many internal and external factors into consideration when determining external partners to collaborate with. However, the result also indicates that really large enterprises with more than 20 000 employees have a bit easier to identify partners

to collaborate with than the medium-sized enterprises (with 10 000 - 19 000 employees). It can be understandable since the really large enterprises may have so many sections and products that they can collaborate with any company from different industries/sectors. Therefore, the size of a company is one of many important factors which every organization should pay attention to as to regard to when identifying collaborators.

In order to help organizations from different sectors, with different sizes to make innovation improvements, it requires the understanding of many other factors concerning innovation and innovation management. Therefore this subsection is followed by the discussion about the existent innovation theory with the hope to give the readers a comprehensive picture of managing innovation in different organizations.

7.1.3 Comparison analysis of the data base with existent innovation theory

- **Company characteristics concerning IM**

According to the graph 6.3, 94% of 182 companies have in general agreed that diversity (nationality, function, gender, etc) in teams is an important factor that increases creativity and the success rate of innovation projects.

When looking at the table 6.12, the readers may see that between 14% and 17% of the companies, which in general emphasize creative problem solving as one of their key criteria when recruiting staff, don't have any profit in 2008 while 40% of the companies, which in general did not agree that this company characteristic is so important, don't have any profit in 2008. This result shows that companies should emphasize creative problem solving when recruiting staff to make more profit and become more innovative.

The table 6.13 shows that all the companies, which in general agreed that they provide learning and education to employees, also have more tendency to agree that their company is the leader in their industry, compared to the other companies which in general disagreed that they provide learning and education to employees. This result implies that the characteristic of providing learning and education to employees is one of many ways for organizations to succeed and become the leader in their sector. With the same mindset, the result from the tables 6.14, 6.15, 6.16 and 6.17 provides companies with solutions that help them to get more chances in becoming the leader in innovation in their industry:

- The success in sharing best practices in organization is a decisive factor in creating and improving innovation in firms
- Organizations should provide resources (time, fund etc) to employees to pursue innovation ideas/projects.
- It's crucial for companies to have a process for managing and mobilizing everyone to come up with innovative ideas.
- Good metrics for evaluating the success of the innovation projects is necessary for organizations to progress in their corporation.

The collaboration with external partners is also a characteristic that makes innovation projects more successful. This is proven in the graph 6.4 and 6.5. And in order to succeed in the collaborative process with external partners, according to the graph 6.6, it's also very important for companies to work together, discuss and share everything within the organization.

- **Innovation factors**

The current innovation factors is always considered to be one of the determining factors that help companies to be aware of their state in innovation compared with the other companies. That way, the companies can exploit the current innovation factors to make the right decision when facing the challenges in innovation.

The graph 6.7 shows that the top three types of innovation prevalent in organizations is: *product/service innovation, product/service delivery innovation and process innovation*. The interesting thing is that the result from the section analysis also proves that product/service innovation is the most prevalent type of innovation among many industries. This factor may help companies in the innovation strategy to choose the best type of innovation which is suitable in the market and at the same time can maximize their profit.

Determining where and when to invest in an innovation project is a challenging task. Therefore the leaders and managers need to be aware of the reasons that promote them to invest in innovation. According to the result from questions qId_246 and qId_247, it's obvious that investing in innovation is important to survive a recession and even increase profitability. For these reasons, nowadays the most popular question in companies is "how can we become more innovative?"

- **Internal factors**

The figure 6.8 raises up the following three top priorities of organizations' top management:

- Maintaining financial performance within a constrained budget
- Maintaining/growing revenues
- Cost reduction

By understanding the most common/popular priorities of companies in organization management, each firm can adapt and adjust its management to reach the customers' need and the requirements of other companies. That way, the company can be more confident in making innovation strategy and managing innovation under the competition with other firms in the market.

The results above also have pointed out that the existence of an innovation manager or equivalent can help companies become more successful in innovation and make more profit from innovation projects. Moreover, rewarding employees has become a popular way in firms to encourage employees to work more effective and come up with more creative ideas.

Finally, it's extremely important for firms to be aware of the factors which block

the success of innovation efforts. The graph 6.9 has figured out the most common blocking factors in firms:

- Short-term management performance priorities clashing with long-term innovation priorities
- Middle management focused on delivery of projects rather than innovation beyond project scope
- Lack of resources, either availability or skill set

These factors are only the most common blocking factors but it gives firms a suggestion on how they can avoid the difficulties to succeed.

- **External factors**

The top three macro trends that are having the most impact on the performance of organizations listed in the graph 6.10 are:

- The global financial crisis
- The change in regulatory requirements and political shifts
- The changes in customer/user needs.

According to the survey most companies recognize that the global financial crisis affected on the performance of their organizations, and most of them are also thinking about innovation during depression times which is too late. Companies should be prepared before this crisis comes

According to the graph 6.11, the top three developments organizations monitors in the external environment are: new technology developments in their sectors, introduction of competitor products and/or services and regulatory changes.

The environment is always in changing and therefore companies are careful to label all the new changes that occur in their sectors. When a new product or service is launched, it affects competitors' position in the market. For instance a new emerging technology can eliminate almost all products which are based on an old technology. There are many innovation management tools that could be used to prevent this happening. According to the theory and the results from data-scan, most organizations are monitoring all developments and external changes that happens in their sectors. With regard to this, companies need a team of experts who can manage all these technological and environmental changes and should build different plans in advance. All other considerations are of no value if the company does not have any action plan for commitment.

All the factors and discussion above have proven our stated innovation theory in chapter 3 and end this section. The advantages that companies may obtain from this thesis is suggestion of managing innovation for organizations to become more innovative and create values in the near future.

7.2 Conclusion

Managing innovation is a hard task that requires the considerations of many factors such as:

- Which industry/sector the particular company belongs to?
- Which size the company has?
- Which are the characteristics and behaviors the company has when facing challenges?
- Which are the internal and external factors that influence the decision making as regards innovation strategy and performance?

According to the discussion in the sectoral analysis, different sectors are more or less innovative depending on both the overall economic situation and how they manage their structure and corporation internally. By knowing the main differences among industries, each organization may be more flexible in the way they choose their external partners and adapt to the market. Besides the sectoral factor, the company size is also an important factor that helps company identify their cooperation partner. Accordingly, organizations in different sectors need to pay attention to this factor to improve their capacity for innovation. The most crucial thing here is that the innovativeness as well as the profits don't depend so much on the company size but rather on how systematically and methodically they organize their in-house system and adapt to the external environment. However, what is meant by a systematical and methodical work may be difficult to express in a straightforward manner. It not only requires the knowledge about the existent sectors and company size but also the consideration of many other internal as well as external factors concerning innovation and IM. Diversity (nationality, function, gender,...) in the organization, creativity, the good metrics for evaluating innovation success, the culture of sharing in the organization and providing resources (time, funding, rewards) to employees are only some of many features that open the way to innovation. Thus innovation is the result of a continuous learning, practicing and cooperation both internally and externally. It's considered to be a complicated and long-run process due to the necessity of linking the innovation factors (inclusive the internal and external factors) with the company characteristics in a changing environment.

Briefly stated, IM is a great challenge that requires the long-term collaboration both internally within the organization and externally with other partners. It's a systematic and methodical work that requires time, knowledge, diligence, skills and commitment. As it has been discussed over the thesis, we could confirm that the innovation theory developed in the "conceptual framework" is proven right, according to the studied companies.

Now it may seem difficult to find out any standard way for different companies to manage their internal structure and become more innovative in a changing environment with many innovation factors included, since different companies have different sizes, characteristics and need to have different behaviors to adapt to the market conditions. Then, how can we provide companies with a methodical way to work and get innovation improvements?

According to the “conceptual framework”, there are three levels for managing innovation, namely the strategic, operational and instrumental level. Therefore companies are suggested to follow these three levels and implement the five routines included in the operational level in a flexible way to hopefully be able to reach their stated innovation goals. And this is indicated to be the most standard way for organizations to succeed.

As mentioned in “The Assessment Software” chapter, the IRS aims at measuring the innovation readiness of different companies, finding out their existing barriers and simultaneously proposing areas of improvement. The necessity of measuring innovativeness in firms to become more successful is no longer something arguable. Accordingly, the goal with this thesis is to come out with the factors that help measuring innovation capacity in organizations. The software has taken up the four dimensions/aspects that perform the innovation measurement in firms: *Leadership & ambition*, *Organization & collaboration*, *Implementation & measurement* and finally *People & culture*. But it’s not enough, since IRS has neither touched the organizations’ internal or external factors, nor the three levels of IM referred to the five routines and their corresponding tools, which also need to be taken into consideration. This implies that the software can still be improved. In this sense, the questionnaire was developed with the intent to complement the software and provide a more comprehensive approach to this thesis.

Finally the next chapter is an attempt to develop Logica’s software and make it more popular in the market!

Chapter 8

Questionnaire

The result could be completed with several interviews in companies, with the help of following questions.

1. What would you say are the core competences of the company you are working for?
2. What is your background (education)? Is the position you have in your company related to your education or your previous work experience?
3. Following are several tools for innovation management. How much does your company/department know about these tools? Choose one suitable alternative (a-e) for each tool.
 - (a) Never heard about this tool.
 - (b) Have heard but do not use it in our company.
 - (c) Have heard and despite we don't use it in the company, we are aware some competitors do.
 - (d) Have implemented it, but didn't get any results.
 - (e) Have implemented it and got interesting results.

i. Innovation Audit

a b c d e

ii. Technology Foresight - Delphi method

a b c d e

iii. Lead Users

a b c d e

iv. Open Innovation

a b c d e

v. Creativity
a b c d e

vi. Technology outlook
a b c d e

vii. Knowledge Management
a b c d e

viii. Patent Analysis
a b c d e

4. For those tools that you have indicated as being implemented in the company, please explain briefly how they have been applied.
5. What is your opinion about open innovation? Is the strategy of the company based on open/close innovation?
6. If the company's strategy is based on Open Innovation, which channels of Open Innovation does your company use?
 - (a) Users/Customers
 - (b) Competitors
 - (c) Suppliers
 - (d) Other firms
 - (e) Universities
 - (f) Government/Public labs
 - (g) Investors/ Venture Capitals
 - (h) Crowd
7. Do you have any Innovation Time off at the company for employees? / How much percentage of employee's time is intended to their personal projects related to be more creative?
8. Do you have any physical context for creativity in your company?
9. How does your company gather information about your customers/market/new products and the future needs in the market?

8.0.1 A brief description of Innovation Management Tools

Innovation Audit: Today more than before companies are talking about the importance of innovation for being successful. What is less well understood is how to become more innovative. In order to improve something, there is always the need to measure it before one can improve it. To improve innovativeness the same requirement is needed. The company needs advices from experts from Innovation field, with high experiences from Innovation Audit who can help the company and providing them the technique and required tools that can help the company to measure and improve their innovation capabilities. “Innovation Audit is a mechanism to help companies to understand innovation, as well as to increase their innovation capability”¹

Technology foresight (Delphi method): Technology Foresight is a systematic process to identify future technology developments and their interactions with the society and the environment. The method is based on collecting experts and gathering information from them, then handing out a questionnaire in two or more rounds in a systematic manner. It is very important that the experts avoid face to face interaction and mutual influencing. After each round, an organizer provides an anonymous summary of the experts’ forecasts from the previous round. Then run several rounds until they approach a consensus result and have identified the action plan for the company. The method helps the company to identify those future needs in the market, and emphasizes the company’s future opportunities.

“Technology foresight is regarded as the most upstream element of the technology development process. It provides inputs for the formulation of technology policies and strategies that guide the development of the technological infrastructure. In addition, technology foresight provides support to innovation, and incentives and assistance to enterprises in the domain of technology management and technology transfer, leading to enhanced competitiveness and growth”².

Lead Users: The method is used by companies/individuals as a market research tool, for developing breakthrough products/services. Lead Users are needed for identifying strong market opportunities and developing the concepts for new products and services. The company can approach breakthrough products, new applications or markets and new directions for the business through Lead Users. Their experiences are a needs forecasting laboratory. They help to bring products to market almost twice faster. Lead Users are people who have two special characteristics, one is that they are at the leading edge of important market trends, and the second is that they have a strong encouragement to find solutions for the novel needs they encounter at the leading edge ³.

Open Innovation: “Is the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the market for external use of innovation respectively. With knowledge now widely distributed, companies cannot rely entirely on their own research, but should acquire inventions or intellectual property from other companies when it advances the business model. Open Innovation assumes

¹(1) <http://www.innovationforgrowth.co.uk/What%20are%20innovation%20audits.pdf>

²(2) UNIDO – <http://www.unido.org/index.php?id=o5216> , February 2012

³(3) Leadusers.com, February 2012

that enterprises can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology.”⁴

Creativity: Innovation is not just about to come up with creative ideas. The chain starts with setting the goals as the first step in a creative process, and then it's about prioritizing and finding those ideas that have the right formulation and help the company to approach their goals and success. The ideas will be judged later and of course the physical atmosphere (environment, pictures, music) in this stage has a vital influence for those who are challenging to think creatively. There are several creativity tools and methodology like Brainstorming, Six hats, Triz, Synectic and etc that helps the group/individuals for creative problem solving. There are always many gaps existing in the creative process, by optimizing the creative ideas and generating new ideas, it should help to fill the gaps and complete the weaknesses from previous ideas. Finally all ideas will be analyzed and judged for evaluation and those with potential for innovation will be developed.

Knowledge management: Any knowledge has a tacit and explicit dimension. To make the explicit knowledge useful requires the tacit dimension, and vice versa.⁵ Knowledge management can not be seen as an alone tool, but should be integrated in all aspects of the company's organization. The purpose with the tool is to improve the performance of the company, competitive advantage, individual and collective learning, connection of people by networking and continuous improvement of the organization.

⁴(4) Chesbrough, H.W. (2003). Open Innovation: The new imperative for creating and profiting from technology. Boston: Harvard Business School Press, p. xxiv

⁵Brug and Duguid, 2001

Chapter 9

Limitations and Future Scope

The goal of the project was to make a new national study among innovative Swedish companies and compare the previous result from 2009 with the current situation among innovative companies, and also analyze how the innovation capability of companies has changed during these three years. Moreover, the study's goal was to propose new ways and methods for increasing the innovativeness of the companies who would participate in the survey. In the beginning the thought was to make a survey among ten innovative companies in Sweden and implement the innovation audit in the company and find out their strength respective weaknesses in this area. In spite of Logica's near relation with their customers, it was hard to get companies to participate in this study. This issue affected the thesis in the way that the opportunity for proving the theory and generating the questionnaire in reality did not happen. There might be many reasons why the companies did not join in this survey and missed the opportunity for measuring their innovativeness.

Nowadays companies are afraid that the information about their capability will spill out in the media, or end up in a comparison with other corporations. Other reasons may exist like, the lack of knowledge about the importance of innovation or the ignorance about the innovation management tools.

The future scope of this study can proceed in Logica. There is needs of experts in this area to implement IRS for measuring innovation, and to provide organizations the necessary tools for improvement of their knowledge, innovation audit, creativity, collaboration, benchmarking, forecasting the future technology and altogether help in achieving competitive advantages and being a innovative company.

Appendix A

Questions from data scan

Radio (1-6)

1.Strongly Agree

2.Agree

3.Tend To Agree

4: Tend To Disagree

5.Disagree

6.Strongly Disagree

qId_221 Please rate in order of importance the top three types of innovation prevalent in your organization.

qId_222 What are currently the three top priorities of your organization's top management?

qId_224 Maintaining performance with a constrained budget – Radio 6

qId_225 Maintaining / growing revenues – Radio 6

qId_226 Regulatory compliance – Radio 6

qId_227 Cost reduction – Radio 6

qId_228 Regional expansion – Radio 6

qId_229 Innovation in products, services delivered and processes – Radio 6

qId_230 Improved user service – Radio 6

qId_231 Other, please specify

qId_233 Innovation is deeply embedded in the culture of our organization – Radio 6

qId_234 Our organization is a leader in innovation in our industry or sector – Radio 6

qId_235 Our industry or sector is in general more innovative than others – Radio 6

qId_236 Our organization does a good job of measuring how successful our innovation efforts are – Radio 6

qId_237 Our organization believes that innovation as a concept is more hype than reality - Radio 6

qId_238 Our employees are diverse in terms of nationality – Radio 6

qId_239 Our organization has a good gender balance at all levels of the organization – Radio 6

qId_242 How do innovation projects get started in your organization?

qId_243 How has spending on innovation changed in your organization over the last two years?

qId_246 Investing in innovation is important to survive a recession – Radio 6

qId_247 Investing in innovation is important to increase profitability – Radio 6

qId_248 Organizations that invest in innovation are more likely to outperform their peers – Radio 6

qId_249 Innovation in a recession is considered less important by management teams – Radio 6

qId_251 Please rank the top three macro trends that are having the most impact on the performance of your organization.

qId_254 Please rank in order of importance the top three factors that influence you in choosing an external partner for innovation projects.

qId_256 In the development of your innovation strategy rank in order of importance the top three developments your organization monitors in the external environment.

qId_257 Other, please specify.

qId_258 Other, please specify.

qId_260 Does your organization have a Chief Innovation Officer or equivalent?

qId_261 If YES, what are the role's major responsibilities?

qId_262 If NO, who is responsible for Innovation?

qId_264 Other factors please specify.

qId_274 Diversity (nationality, function, gender etc) in teams increases creativity and the success rate of our innovation projects – Radio 6

qId_275 We emphasize creative problem solving as one of our key criteria when recruiting staff – Radio 6

qId_276 Innovation capability is an important measure in our career and promotion decision process – Radio 6

qId_277 We provide learning and education to our employees to enhance their ability to think innovatively – Radio 6

qId_278 We succeed in sharing best practices within our organization – Radio 6

qId_279 Our organization encourages employees to learn from failures – Radio 6

qId_280 Our organization provides resources (time, funds etc) to employees to pursue innovative ideas/projects – Radio 6

qId_281 We have a process for managing and mobilizing everyone to come up with innovative ideas – Radio 6

qId_282 We have good metrics to evaluate the success of our innovation projects – Radio 6

qId_283 Our innovation initiatives are specific to business units or country organizations rather than international – Radio 6

qId_286 Innovation in the nature of our products and / or services. – Radio 6

qId_287 Innovation in the process used to create and deliver our products and / or services – Radio 6

qId_288 Innovation in the way we approach our sector and sell to customers or deliver services to users – Radio 6

qId_289 Innovation in new business models – Radio 6

qId_291 Other, please specify

qId_292 Please rate in order of importance the top three ways your organization rewards employees for successful innovation projects

qId_293 Please rate in order of importance the top three ways innovation is monitored by your organization.

qId_294 Please rank in order of importance the top three factors that block the success of your innovation efforts.

qId_295 In your organization, how quickly must an innovation project produce results before it is canceled?

qId_297 Most of our innovation projects include the significant involvement of one or more external partners – Radio6

qId_298 Innovation projects that include significant collaboration with external partners are more successful – Radio6

qId_299 Innovation projects that include significant collaboration with external partners are more difficult to execute

qId_300 Successful partnerships require the establishment of entities with distinct return on investment responsibilities. – Radio 6

qId_301 A culture of sharing within an organization makes it easier to collaborate with external partners – Radio 6

qId_302 Collaborative processes with external partners is an important enabler of innovation – Radio 6

qId_303 Innovation projects are more successful when placed in their own organizations – Radio 6

qId_304 Our organization has difficulty in identifying partners to collaborate with – Radio 6

qId_305 Please rate in order of importance the top three ways your organization sets up partnerships between internal teams and external parties.

qId_306 Other ways, please specify.

qId_307 Please rate in order of importance the top three factors in your organization that enable the success of partnerships between internal teams and external partners.

qId_308 Other factors, please specify

qId_309 Please rate in order of importance the top three factors in your organization that block the success of collaboration between internal teams and with external partners.

qId_310 Other factors, please specify.

qId_313 Please rate in order of importance the top three reasons to collaborate with external partners.

qId_314 Other factors, please specify.

qId_315 Can you outline some examples of how your organization uses collaborative innovation to improve its chances of success?

qId_316 Would you be willing to be re-contacted to take part in further research concerning the issues discussed in this interview?

qId_319 Please enter your COMPANY NAME or ORGANISATION'S DIVISION, DEPARTMENT or MINISTERIAL BODY.

qId_320 Please indicate your organization's primary INDUSTRY.

qId_321 Please indicate the COUNTRY where your organization is headquartered

qId_322 Please indicate REVENUES (in Millions of Euro) for your organization* for FY'08.

qId_323 Please indicate the EBITDA profit (in millions of Euro) of your organization* in 2008.

qId_324 Please enter the number of EMPLOYEES employed by your organization* in 2008

qId_339 Are you interested in receiving a complimentary copy of the research findings and / or being invited to our Innovation Conference in October

qId_340 If "Other" was selected above, please describe.

qId_351 Client name
qId_352 Client title
qId_353 Company name
qId_354 Relationship owner

Appendix B

Matlab code

```
function ansProc = barplot(answer, col, titleText)

% Show the horizontal histogram of different questions.

l = length(answer);

numberOfNoAnswer = answer(1);

numberOfAnswer = sum(answer) - numberOfNoAnswer;

ansProc = answer./numberOfAnswer*100;

ansProc = ansProc(1:l-1);

ansProc = sort(ansProc);

barh(ansProc, col); title(titleText);

end
```

```

function ansProc = piechart(answer, titleText)
% Show the horizontal histogram of different questions.
l = length(answer);
numberOfNoAnswer = answer(1);
numberOfAnswer = 221 - numberOfNoAnswer;
ansProc = answer./numberOfAnswer*100;
ansProc = ansProc(1:l-1);
ansProc = round(ansProc);

alt = {[num2str(ansProc(1)) '%', ' Strongly Agree'];
[num2str(ansProc(2)) '%', ' Agree'];
[num2str(ansProc(3)) '%', ' Tend To Agree' ];
[num2str(ansProc(4)) '%', ' Tend To Disagree'];
[num2str(ansProc(5)) '%', ' Disagree'];
[num2str(ansProc(6)) '%', ' Strongly Disagree']};

if l == 3
    pie(ansProc, {[num2str(ansProc(1)) '%', ' False'],
[num2str(ansProc(2)) '%', ' True']});
    title(titleText);
else

    if ansProc(1:l-1) ~= 0
        pie(ansProc, alt);
        title(titleText);
    end

    if ansProc(1) == 0
        ansProc = ansProc(2:l-1);
        pie(ansProc, alt(2:l-1));
        title(titleText);
    end

    for i = 1:l-2
        if ansProc(i) == 0
            ansProc = [ansProc(1:i-1); ansProc(i+1:l-1)];
            pie(ansProc, [alt(1:i-1);alt(i+1:l-1)]);
            title(titleText);
        end
    end

    if ansProc(l-1) == 0
        ansProc = ansProc(1:l-2);
        pie(ansProc, alt(1:l-2));
        title(titleText); end
    end

end
end

```

```

function sizeVSprofits()
    % Show the horizontal histogram with number of companies in the x-axis
    % and number of employees in the y-axis
    % The different levels of revenues will be shown in different colors in each stapel
    % Number of no comments (inklusive "don't know") is 48.

    A = [8 0 0 1 0 0 0 0 4 1;
         8 1 0 1 0 0 0 0 9 6;
         4 0 1 2 0 2 0 0 4 3;
         4 9 4 5 3 0 0 1 2 5;
         0 1 0 4 1 2 0 0 2 4;
         1 1 1 2 2 2 0 1 3 2;
         0 5 2 9 5 5 3 13 7 7];

    nbrOfCompanies = zeros(7,1);
    for i = 1:7
        nbrOfCompanies(i) = sum(A(i,:));
    end

    Revproc = zeros(7,10);
    for i = 1:7
        for j = 1:10
            Revproc(i,j) = A(i,j)/nbrOfCompanies(i)*100;
        end
    end

    nbrOfCompanies
    Revproc

    barh(A,'stacked');
    title('The relation between the companies´size and their profits in 2008');
end

```

```

function sizeVSrevenues()
    % Show the horizontal histogram with number of companies in the x-axis
    % and number of employees in the y-axis
    % The different levels of revenues will be shown in different colors in each stapel
    % Number of no comments (inklusive "don't know") is 48.

    A = [8 2 1 1 0 0 0 0 2 0;
         4 4 6 3 0 1 1 1 5 0;
         1 0 0 5 2 3 0 1 3 1;
         0 1 2 11 6 7 1 3 0 2;
         0 0 0 1 4 4 1 2 2 0;
         0 0 0 0 3 5 2 3 2 0;
         0 0 0 1 2 9 6 35 2 1];

    nbrOfCompanies = zeros(7,1);
    for i = 1:7
        nbrOfCompanies(i) = sum(A(i,:));
    end

    Revproc = zeros(7,10);
    for i = 1:7
        for j = 1:10
            Revproc(i,j) = A(i,j)/nbrOfCompanies(i)*100;
        end
    end

    nbrOfCompanies
    Revproc

    barh(A,'stacked'); title('The relation between the companies´ size and their rev-
enues');
end

```

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