# THESIS APPROVAL

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Doctor of Engineering (Industrial Engineering)

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Industrial Engineering                          Industrial Engineering

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TITLE:     A Company External Knowledge Taxonomy

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THESIS


A COMPANY EXTERNAL KNOWLEDGE TAXONOMY


PEKKA  KESS


A Thesis Submitted in Partial Fulfillment of

the Requirements for the Degree of

Doctor of Engineering (Industrial Engineering)

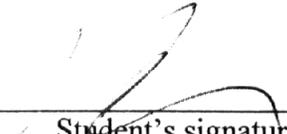Graduate School, Kasetsart University

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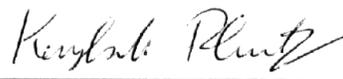
The purpose of the research was to build a taxonomy to the external knowledge that small and medium sized companies utilize in order to perform better in business terms. The building of the taxonomy is based on literature survey of the knowledge management literature, on a survey carried out mainly in Finland and partly in Thailand as well as on interviews. The research utilizes the qualitative concept creation research paradigm and grounded theory is used to analyze the data from the surveys and interviews.

The result of the survey is a taxonomy where at the highest abstraction level the following 6 areas of expertise are identified: the Mentor - the Angel - the Guru – the Coach - the Politician - the Father. These roles represent all aspects of the external knowledge that was identified in this research. The taxonomy has been built as a three level hierarchy.

The academic contribution of the research comes from the fact that the knowledge content in this research has been fully defined from the SME utilization point of view. The results of the research gives the SME managers a tool to analyze their external knowledge needs and the possibilities utilize to utilize various forms of external knowledge to specific needs for the company. To the government agencies the created taxonomy gives a tool to develop better knowledge services to the SMEs.

_____           _____   10 / 0T / 2007
Student's signature                     Thesis Advisor's signature

# ACKNOWLEDGEMENTS

management in connection to outsourcing. This work had a very positive impact on this research. I would like to use this opportunity to thank Margit for her professional work as well as the students for their effort to collect very useful data for the research purposes.

I have had the opportunity to talk to, to interview and to survey tens of people so mentioning all of you would take a lot of space and certainly I would forget one or two names anyhow. I use this opportunity to thank you all for your contribution to this work.

My research time at the Kasetsart University has been made financially easier by the Graduate Study Scholarship from the International Graduate Program in Industrial Engineering. I would like to use this opportunity to thank all those, who made the scholarship possible. I do hope that I will have the opportunity to pay back this with some interests in times to come.

This research project was also part of my family projects. I started this research at the same time as Annukka, when she started her doctoral work. Without this side-by-side working this project would not be at the end. Annukka, I thank you for your love and care through these years and years to come. This has been an enjoyable journey with you.

Pekka Kess
October 2007

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# LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| A/a | = | Administrator |
| ABC | = | Activity Based Costing |
| AI | = | Artificial Intelligence |
| APQC | = | American Productivity and Quality Council |
| ASIC | = | Application Specific Integrated Circuit |
| ASIS | = | American Society for Information Science |
| BOI | = | Board of Investment |
| B2B | = | Business-to-Business |
| CEO | = | Chief Executive Officer |
| CFIE | = | Confederation of the Finnish Industry and Employment |
| CMM-I | = | Capability Maturity Model Integrated |
| df | = | Degree of freedom |
| DSS | = | Decision Supporting Systems |
| E/e | = | Entrepreneur |
| EEDC | = | Employment and Economic Development Centre) |
| EQA | = | European Quality Award |
| ERP | = | Enterprise Resources Planning |
| EU | = | European Union |
| FCE | = | Finnish Centre of Expertise |
| GLOS | = | General Lack of Success Failure |
| GMP | = | Good Manufacturing Practice |
| H0/H1 | = | Hypothesis (0/1) |
| HR | = | Human Resources |
| HRM | = | Human resources Management |
| HW | = | Hardware |
| I/i | = | Integrator |
| IC | = | Integrated Circuit |
| ICT | = | Information and Communication Technologies |
| IE | = | Industrial Engineering |

| | | |
|---|---|---|
| IEM | = | Industrial Engineering and Management |
| IFCT | = | Industrial Finance Corporation of Thailand |
| IKMN | = | International Knowledge Management Network |
| IPO | = | Initial Public Offering |
| IPR | = | Intellectual property Rights |
| ISO | = | International Standardization Organization |
| IT | = | Information technology |
| JIT | = | Just-In-Time |
| KBMS | = | Knowledge Base Management System |
| KIBS | = | Knowledge Intensive Business Services |
| KM | = | Knowledge Management |
| KMS | = | Knowledge Management System |
| M | = | million |
| MBNA | = | Malcolm Balridge National Award |
| MD | = | Managing Director |
| MRP | = | Materials Requirement Planning |
| MS | = | Microsoft |
| N | = | number |
| NPD | = | New Product Development |
| OD | = | Organizational Development |
| OS | = | Operating System |
| OSHA | = | Occupational Safety and Health Association |
| P/p | = | Producer |
| P-CMM | = | People Capability Maturity Model |
| Q1/2 | = | Question1/2 |
| QFD | = | Quality Function Deployment |
| R&D | = | Research and Development |
| RFID | = | Radio Frequency Identification |
| SECI | = | Socialization – Externalization – Combination – Internalization |
| SIFC | = | Small Industry Finance Corporation |
| SME | = | Small and Medium Sized Enterprise |
| SW | = | Software |

| | | |
|---|---|---|
| SWOT | = | Strength – Weakness – Opportunity – Threat |
| TOC | = | Theory of Constraints |
| TQM | = | Total Quality Management |
| VC | = | Venture Capital / Capitalist |
| WIP | = | Work-In-Process |
| Z | = | Test statistics |
| 4P | = | Product, Price, Promotion and Place |

# A COMPANY EXTERNAL KNOWLEDGE TAXONOMY

## INTRODUCTION

The title of this research is "A Company External Knowledge Taxonomy". This challenges the researcher to define the terms and concepts in a way they can be understood enough in a coherent manner, so that the reader has an understanding what the researcher is writing about.

Scientific research process is directed by the paradigm of the researcher. Kuhn (1970) writes about research paradigm, which sets the foundation to the research and the paradigm constitutes the basic assumptions. The first set of boundaries to any research comes from the discipline in which the research has been carried out. This work is done as part of the doctoral studies in Industrial Engineering. Industrial engineering is a branch of engineering that concerns the development, improvement, implementation and evaluation of integrated systems of people, knowledge, equipment, energy, material and process. Industrial engineering draws upon the principles and methods of engineering analysis and synthesis, as well as mathematical, physical and social sciences together with the principles and methods of engineering analysis and design to specify, predict and evaluate the results to be obtained from such systems. Industrial engineers work to eliminate wastes of time, money, materials, energy and other resources.

Industrial engineering is also known as operations management, production engineering, manufacturing engineering or manufacturing systems engineering; a distinction that seems to depend on the viewpoint or motives of the user. The name "industrial engineer" can also be misleading. While the term originally applied to manufacturing, it has grown to encompass services and other industries as well. Similar fields include operations research, systems engineering, ergonomics and quality engineering. There are a number of things industrial engineers do in their work to make processes more efficient, to make products more manufacturability and consistent in their quality, and to increase productivity. (Industrial Engineering, 2006)

With the definition above this research falls well into the scope of Industrial Engineering and also Industrial Engineering helps defining the research methods to be used.

**Problem background**

Background on Knowledge Management

Knowledge Economy (Aslesen, 2004; Cooke, 2004; Etzgebarria and Uranga, 2004; Kitigawa, 2004; Lorenzen and Maskell, 2004; Poma and Sacchetti, 2004; Sokol, 2004; Sotarauta and Kosonen, 2004; Tavoletti, 2004; White and Grime, 2004) is one of the buzz words of today. A lot of research has emerged in this field in the very recent years even the concept itself has been around for more than 40 years now (Cooke, 2004; Machlup, 1962). In the field of knowledge economy the scope can be either macro or micro. Even with the vast number of writings about knowledge economy Piccaluga (2004) asks for more 'stories'. He is not only interested in success stories in the field of knowledge management but also failures. This research however is not built on that objective not for stories of success nor failure. Here the attempt is to build a tool to understand the phenomenon behind the success as well as the failure. The research on success and failure with causes and effect will follow this research utilizing the taxonomy that is created in this research.

This research is about company external knowledge. Knowledge and Knowledge Management have been raised to one the key elements of successful business and to an important aspect of the management paradigm in the 21st century (Hitt, 2000; Dess and Picken, 2000). However there has been and still is a lot of conceptual confusion (de Long and Seemann, 2000) about knowledge management. "Whenever two people are talking about 'knowledge management' the breadth and complexity of the subject make it likely that the discussion is built on untested assumptions, different levels of analysis, varying levels of experience and different objectives" (de Long and Seemann, 2000).

There are five main theories to explain the rationale of an enterprise in existing literature. These theories are transaction cost theory, resource-based theory, knowledge-based theory, organizational learning perspective, and sociological approach. This research has its founding in the knowledge-based theory of the firm. This does not mean that there is a valuation of truth likeness between the various theories but more that it just fits better to the research questions proposed in this research. Knowledge-based view explains firms as heterogeneous knowledge-bearing entities, which is a complement perspective to the pure contractual interpretation on the nature of the firm (Foss, 1996). Firm is not only a contractual entity, but just as much its function as a repository of distinct productive (technological and organizational) knowledge, and as an entity that can learn—and grow—on the basis of this knowledge (Dosi *et al.,* 1992). Firm plays the role that it permits individuals to specialize in developing specialized expertise, while establishing mechanisms through which individuals coordinate to integrate their different knowledge bases in the transformation of inputs into outputs (Grant, 1997). Therefore, by resorting to cooperation with other firms and individuals, a firm is able to both better utilize its internal knowledge resources and access the outside knowledge resources. As the knowledge boundaries of individual industries become increasingly fluid, such inter-firm collaboration also avoids the long time lags in developing new capabilities internally, and allows firms "strategic options" on new technologies in the face of uncertainty over future knowledge requirements (Grant, 1997). Thus, alliances provide the best context for creating value by exchanging or combining dispersed knowledge. Firms that face high environmental uncertainty especially can utilize alliances to enhance and speed organizational learning, reshape their environment and reduce strategic uncertainty (Hoffmann and Schlosser, 2001). Therefore, there is an incentive to study the external knowledge as means of achieving good performance through managing that knowledge.

The original idea of this work dates back to the early 90's, when I had the opportunity to get to know Mr. Jack Savidge from, California, USA. He introduced to the Finnish business community through The Finnish Academies of Technology the four key roles of the 'Path Masters' that an entrepreneur could utilize through the

tough times of business competition, i.e. the Mentor, the Guru, the Coach and the Angel (Savidge, 1994). Soon after the introduction of those roles of external expert people with some specific knowledge, I started to follow the discussion about entrepreneurship in Finland compared that to the other parts of the world and especially to the US and Asia. I started to wonder, if there was a difference between the entrepreneurs in various countries how these external experts are utilized to achieve business success. I decided to make a study on the possible similarities and differences of this matter. Soon, however, I discovered that the model of external knowledge by Savidge was not sufficient for the academic research. This led me to study the concept of business external knowledge and soon noticed that it had not been defined well enough to carry out comparative studies using existing definitions and concepts. The result was, and is documented in this thesis, that the concept of external knowledge is not well defined and it should be defined before a comparative study can be conducted.

The management discipline and practices have developed in the area of knowledge management significantly in the past decades. Pfeffer (1981) wrote, that 'It is fair to state that most organizations posses within them the knowledge and expertise necessary to solve their own problems…'. On the other hand Pfeffer admits that there is a room for outside experts: (1) the outside expert can permit power to be used to affect decisions in a somewhat less visible way and (2) the outside expertise can serve to legitimate the decision reached and to provide an aura of rationality to the decision process. Overall however, Pfeffer (1981) does not count on the external knowledge as such. This was however some twenty years before this research really started. And the opinions, even those of Pfeffer, have changed since.

Knowledge Management caters to the critical issues of organizational adaptation, survival and competence in facing increasingly discontinuous environmental change. Essentially, it embodies organizational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings (Malhotra 1997). This is a strategic view of Knowledge Management that considers the synergy

between technological and behavioral issues as necessary for survival in the 'wicked environments.' The need for synergy of technological and human capabilities is based on the distinction between the 'old world of business' and the 'new world of business.' Within this view, the 'old world of business' is characterized by predictable environments in which focus is on prediction and optimization based efficiencies. This is the world of competence based on 'information' as the strategic asset and the emphasis is on controlling the behavior of organizational agents toward fulfillment of pre-specified organizational goals and objectives. In contrast, the 'new world of business' is characterized by high levels of uncertainty and inability to predict the future. Use of the information and control systems and compliance with pre-defined goals, objectives and best practices may not necessarily achieve long-term organizational competence. This is the world of 're-everything,' which challenges the assumptions underlying the 'accepted way of doing things.' This world needs the capability to understand the problems afresh given the changing environmental conditions. The focus is not only on finding the right answers but on finding the right questions. This world is contrasted from the 'old world' by its emphasis on 'doing the right thing' rather than 'doing things right' which is basically the difference between operational excellence and strategic excellence.

Knowledge management focuses on 'doing the right thing' in addition to 'doing things right.' Here the knowledge management is a framework within which the organization views all its processes as knowledge processes. In this view, all business processes involve creation, dissemination, renewal, and application of knowledge toward organizational sustenance and survival. This concept embodies a transition from the recently popular concept of 'information value chain' to a 'knowledge value chain.' (Nonaka and Takeuchi, 1995). Here Nonaka and Takeuchi do not explicitly say that it is about company internal knowledge, but if they assume the knowledge value chain to go through the organizational boundaries they should also emphasize the difference of the knowledge management inter firm and intra firm.

The difference here is that the information value chain (above) considers technological systems as key components guiding the organization's business

processes, while treating humans as relatively passive processors that implement 'best practices' archived in information databases. In contrast, the knowledge value chain treats human systems as key components that engage in continuous assessment of information archived in the technological systems. In this view, 'best practices' are not implemented without active inquiry by the human actors. Human actors engage in an active process of sense making to continuously assess the effectiveness of 'best practices.' The underlying premise is that 'best practices' of yesterday may not be taken for granted as 'best practices' of today or tomorrow. Hence, double loop learning, unlearning and relearning processes need to be designed into the organizational business processes.

The most important issue for companies is to ensure that they focus on the creative and innovative capacity of their human members and the synergy of data and information processing capacity of information technologies. The 'human sensors' that are interacting continuously on the front lines with the external environment have a rich understanding of the complexity of the phenomena and the changes that are occurring therein. Such sensors can help the organization synchronize its programmed routines ('best practices', etc.) with the external reality of the business environment. Hence, organizational processes need to implement what is called 'loose tight' knowledge management systems. The tightening is in the reinforcing linkage between the archived organizational 'best practices' and the actions taken by organizational members based on that information. The loosening is in the reverse unraveling linkage between actions taken by organizational members [and their consequences] that serve as a continuous check for renewing the archived 'best practices.' This is where human creativity and innovation comes into the picture.

It is the role of knowledge management to connect two components that make up the "who" knowledge owners and knowledge seekers. The knowledge of one is transferred to the mind of the other, so that a new decision can be made or a situation handled. Knowledge management provides a means to capture and store passing knowledge and broker it to the appropriate individuals.

It is also critical to differentiate between various types of knowledge. One and at the same time the most common way to do so is to divide knowledge to explicit knowledge and tacit knowledge (Nickols, 2000; Nonaka et al 1995; 1998; Polanyi 1966). Tacit knowledge is more hypothetical, subjective, personal and substantially more difficult to communicate. Tacit knowledge is the primary focus of many knowledge management initiatives, because it is the repository of an organization's most strategically valuable knowledge.

The primary challenge of addressing explicit knowledge is managing its volume to ensure its relevance. A common deficiency facing organizations is information overload, as the levels of explicit knowledge become so overwhelming that it cannot be appropriately filtered. It is the management of explicit knowledge on which most organizations are focused. But as organizations make advancements in knowledge management, they realize that managing tacit knowledge is even more strategic. The challenge of managing tacit knowledge is formulating it into a communicable form and distributing it to the knowledge seeker.

Nonaka and Takeuchi (1995) point out that human knowledge is created and expanded through social interaction between tacit knowledge and explicit knowledge. This interaction is called knowledge conversion that finds expression in four different modes: (1) from tacit knowledge to tacit knowledge (socialization), (2) from tacit knowledge to explicit knowledge (externalization), (3) from explicit knowledge to explicit knowledge (combination) and (4) from explicit knowledge to tacit knowledge (internalization). Socialization is a process of sharing experiences and thereby creating tacit knowledge such as shared mental models and technical skills. It yields what can be called "sympathized knowledge". Externalization means a process of articulating tacit knowledge into explicit concepts and combination is a process of systematizing concepts (from different bodies of explicit knowledge) into a knowledge system. So, externalization outputs "conceptual knowledge" and combination gives "systemic knowledge". A process of embodying explicit knowledge into tacit knowledge is internalization. It produces "operational knowledge".

Experience tells that typical knowledge seekers nowadays are the small start-up´s and so called high tech companies. They do posses only limited knowledge to ensure a healthy growth. Knowledge and competence even for some key areas of business might be external for long periods of time. The more unknown and turbulent the market, the bigger is the challenge. The problem is very serious for the new high tech companies, because they have to reach the big and unknown international market at very early stages.

Anyway, the knowledge seeker problem is not unique, although the uncertain market with discontinuities would seem unique. The young companies in "the old world of business" know the problem too. Franchise systems in the service sector are experts in creating and supporting successful companies, successful entrepreneurs. The success of the head and founder of the system, franchisor, depends on the success of local companies, franchisees. That is why "the knowledge of one is transferred to the mind of the other, so that a new decision can be made or a situation handled". The franchisor is knowledge owner and the franchisee is knowledge seeker.

The continuously increasing intensity of companies to network has created a new possibility to knowledge sharing.  Network is defined (Pikka *et al.,* 2004) as the group of actors who change information and who have a common interest. Companies no longer compete alone as autonomous entities, but rather as part of a network (Lambert *et al*., 1998; Christopher, 1998). Naturally one company can be in several networks. Managerial doctrines have emphasized core competencies as a success factor in business. Today companies focus on their core competencies and by networking complement non-core competencies. Especially in the ICT-industry, networking has come a widely accepted strategic way of action. Scale, cost and quality are the paradigms where business is managed (Kolarik, 1999; Pine, 1993; Suri, 1998; Womack and Jones, 1996). According to Harrington (2000), the 21st century is bringing rapid innovation, driven by the continuing high-tech boom and expanding global markets from the last decade. Speed and agility are common requirements, not only for the ICT-firms, but also for the traditional industries, like the steel product industry. Collaboration covers besides traditional production, also

research and development activities. Business networks, and today even more interesting phenomena in research world, social networks, are important factors in the regional development. For example, there is the evidence that historical development as well as the particular structure of the social networks in Silicon Valley have fostered relatively higher growth and development of the region (Castilla, 2003).

Categorizing the object is part of the research work. In this study it is to formulate a concept to research object "External Knowledge" or more precisely "Company (SME) External Knowledge applicable to enhance the business performance". In this research the selection is made to call the model as taxonomy (Becerra-Fernandez, 2000**;** Goncalves and Gudwin, 1998; Gorman 2002; Liebowitz 2001**)**. There are some other characterizations as ell that have been used in connection to Knowledge Management. These are:

a) Knowledge ontologies (Brewster, 2002; Brewster *et al.*, 2003, 2004; Brewster and O'Hara, 2004, 2007; Davies et al., 2003, 2005; Fensel, 2002, 1999; Kim *et al.*, 2003; Lambe, 2002; Liebowitz, 1999; Martinez-Bejar et al., 1997; Mika *et al.*, 2003; Staab *et al.*, 2001, 2003; Sure, 2002; Sure *et al.*, 2002, 2003)

b) Knowledge repositories (Argote and Ingram, 2000; Desouza and Evaristo, 2003; Gerbé, 1997; Gray, 2001; Zarri and Azzam, 1997)

c) Knowledge types (Ahn and Chang, 2002; Blackler, 1995; Gorman, 2002; Lam, 2000; Ropohl, 1997)

d) Knowledge typologies (Banks, 1993; Capurro, 2006; Demaid and Quintas, 2004; Deng, 2006; Forzi *et al.*, 2003; Gopalakrishnan and Bierly, 2001; Iles 2002)

e) Knowledge categorizing (Alavi, 2000; Blumentritt and Johnston, 1999; Smits and de Moor, 2004; Soliman and Spooner, 200)

f) Knowledge classifications (Koh and Maguire, 2004; Lopes and do Rosário Martins, 2006; McAdam, 1999) (see later the Literature review for various classifications)

Basically they are very close to each other, but do have some minor differences to their approach to decompose an entity into small parts.

Background on Small and Medium Sized Enterprises

Micro, small and medium-sized enterprises are socially and economically important, since they represent 99 % of all enterprises in the EU and provide around 65 million jobs and contribute to entrepreneurship and innovation. However there are no universally accepted SME business definitions. What is regarded in the US as a small business by definition would often be regarded as a medium sized business elsewhere in the world. The definitions of these enterprises in the EU are described in Table 1. (SME definition 2007)

**Table 1** Defining SME's in the EU

| Enterprise category | Headcount | Turnover | Balance sheet |
|---|---|---|---|
| micro | < 10 | ≤ 2 M€ | ≤ 2 M€ |
| small | < 50 | ≤ 10 M€ | ≤ 10 M€ |
| medium-sized | < 250 | ≤ 50 M€ | ≤ 43 M€ |

In the US the definition of small business is more complex and more bureaucratic (SBA, 2006). The definition depends on the business sector in which the enterprise operates. The turnover limit can be from 0.75 M$ to 32.5 where the business is considered to be a small business. Likewise the number of employees, if defined, can be from 50 to 1500. Both these depending on the business in which the company operates. Just as an example in new car dealer business a small company has a turnover of less than 26.5 M$, where in used cars the limit is 21 M$ and in motorbikes 6.5 M$ (SBA, 2006).

At present, there is no generally agreed definition of SMEs in Thailand (Definition, 2007). Each organization has derived their own definition for convenience in their work. The various administrative organizations which deal with the SMEs classify SMEs based on measures of fixed assets, registered capital, sales or number of employees.

a) Ministry of Industry in Thailand has defined the SMEs as follows:

By number of employees:

- Small Scale : less than 50 persons

- Medium Scale : 50 - 200 persons

By fixed assets:

- Small Scale : less than Baht 20 ( ~ 0.5 M€)

- Medium Scale : Baht  (0.5 – 5 M€)

b) The Industrial Finance Corporation of Thailand (IFCT), the Small Industry Finance Corporation (SIFC) and the Bank of Thailand define small industries as fixed asset investment less than 20 million Baht  ( ~ 0.5 M€).

c) Office of the Board of Investment (BOI) has defined small scale industries with fixed assets less than Baht 10 million (~ 0.25 M€) and medium scale industries with fixed assets more than Baht 10 million (~ 0.25 M€) but less than Baht 100 million. ( ~ 2.5 M€)

The principle criterion in Thailand (and in most of the countries) for SME is the independence of the enterprise. This characteristic indicates that not more than 25% of SME capital should be owned by one large or many large companies.  At present, there are many multinational companies in the form of franchise companies and joint-venture between Thai and overseas companies. Some of these companies should not therefore be classified as Thai SMEs.

Every business has a life span that is defined by its business life cycle.  This life cycle is usually defined as having four stages (Introduction; Growth; Maturity and Decline). Most businesses typically follow a skewed bell curve distribution, with sales eventually tapering off over time. Armed with this information, the key to predicting the nature of the eventual Decline phase of a company lies in efforts to determine why a business fails.  A General Lack of Success Failure (GLOS) is characterized by profits not meeting the owner's expectations, resulting in the company eventually being sold off, shut down, etc. A review of the Dun & Bradstreet Corporation

statistics (Duncan, 1993) indicates that roughly 88.7 percent of all business failures are due to management mistakes. After looking at the underlying reasons for these management related mistakes, the following twelve reasons for a failure were developed (Preventing, 2007):

1. The entrepreneur tends to go into business for the wrong reasons. The following motivations have been found as reasons for going into business:

   i. A desire to be one's own boss. Many entrepreneurs failed because they underestimated the time commitment the business would be exact upon their lifestyle.

   ii. A desire for financial independence. The desire for financial independence is a double edged sword. Unfortunately, the inexperienced entrepreneur often does not realize that along with the opportunity for financial independence, goes the opportunity to lose everything that he/she owns.

   iii. A lack of ability to work with/for others. Entrepreneurs often overlook the fact that this basic lack of human relation skills is going to adversely affect how they interact with their "new" boss, the buying public.

   iv. A general disdain of "paperwork" in their current job. This "free spirit" approach to entrepreneurship, unfortunately does not take into account the increasing demands of the IRS, FDA, EU … With increasing regulations, it appears that paperwork is going to become even more central to the entrepreneurial way of life.

   v. A desire for creative freedom. Not a bad reason, as long as the end product will appeal to a large enough target market. The key here is that although one knows entrepreneurs like to "do their own thing," they must produce a marketable product if their companies are expected to survive.

   vi. A desire to use one's skills and knowledge. Of these reasons cited, this is the best rationale behind starting one's own business. This rationale dovetails into the five factors that predicate the success of a company. These factors are:

Experience     knowledge of the industry

Expertise      in the field of the new business

Effort         the long hours necessary for most businesses

Finances      positive cash flow

Luck          this is what binds it all together

2.  The entrepreneur asks advice of family and friends. In most cases, advice from relatives is well meaning, well intentioned, but many times wrong. It is human nature to not want to tell a loved one that his/her product tastes bad, or that his/her cleaning service is overpriced. Consequently, if an entrepreneur is not aware of this natural bias, it is easy to see how he/she would be led into making wrong decisions for the right reasons.

3.  The entrepreneur is in the wrong place at the wrong time.  Because the business environment is in a constant state of flux, there are certain unforeseen problems.  To a certain extent, such fluctuations are beyond the control of the typical business owner. As stated above, it does not hurt to be lucky if you want to be an entrepreneur.

4.  The entrepreneur gets worn out and/or underestimates the time requirements. To be a successful entrepreneur, one typically needs to be an aggressive, self-starting, high energy individual.

5.  Family pressures on both time and money commitments.  A family owned business can exert tremendous pressures upon a business owner. Caught in a constant conflict between what is best for the family, and what is best for the company, the business owner is faced with a "lose - lose" situation. A family owned business has a much higher probability of being a failure than does a company that is not closely held by a family.

6.  Pride.  As with the saying "Pride goeth before the fall . . . ," so it is with pride in the business world. It is not uncommon to find a business owner that is unwilling to seek help when facing a situation that he/she knows nothing about. Instead, by forging

ahead without guidance, many companies get trapped into the poor performance that typifies a failure.

7. Lack of market awareness. A successful entrepreneur must have experience in the industry. What is often noticed is that the entrepreneur tends to underestimate the competition in size, strength, or quantity, and/or overestimates the size of the market. If an entrepreneur is attempting to penetrate a nonexistent or highly competitive market, and is not aware of these market characteristics, the company is probably headed for a failure.

8. The entrepreneur falls in love with his/her product. This is a common characteristic with older, more established companies. Many entrepreneurs are fearful of modifying existing product lines, to come up with new ones, or of dropping old favorites if they turn out to be losing money. Entrepreneurs should instead adopt "Product Re engineering." In some cases, the product does not need to be changed as much as the end market needs to be retargeted.

9. Lack of fiscal responsibility and awareness. Probably the leading cause of business failure is the lack of understanding of the importance of timely and accurate financial information.

10. Lack of a clear focus. Many failures can be traced back to the lack of a clear mission statement and/or business plan.

11. Too much money. There are definite problems that can be associated with having too much money. The root problem is that it allows for inefficiencies to enter the operation. Once discovered, the initial attempt to resolve a problem is all too often to throw money at it rather than to spend the time and effort necessary to uncover the root source.

12. Optimist/Realist/Pessimist. Unlike the traditional saying "A good business manager hires optimists as salesmen and pessimists to run the credit department," a

successful business owner must have a blend of each of these personality traits in order to effectively deal with the changing business environment. If one particular area overshadows all of the others, the company will not achieve its optimum level and a failure will result.

A survey by Scottish Enterprise indicates (McQuaid, 2003) main problems that entrepreneurs face when getting started their business. The results are shown in Figure 1.
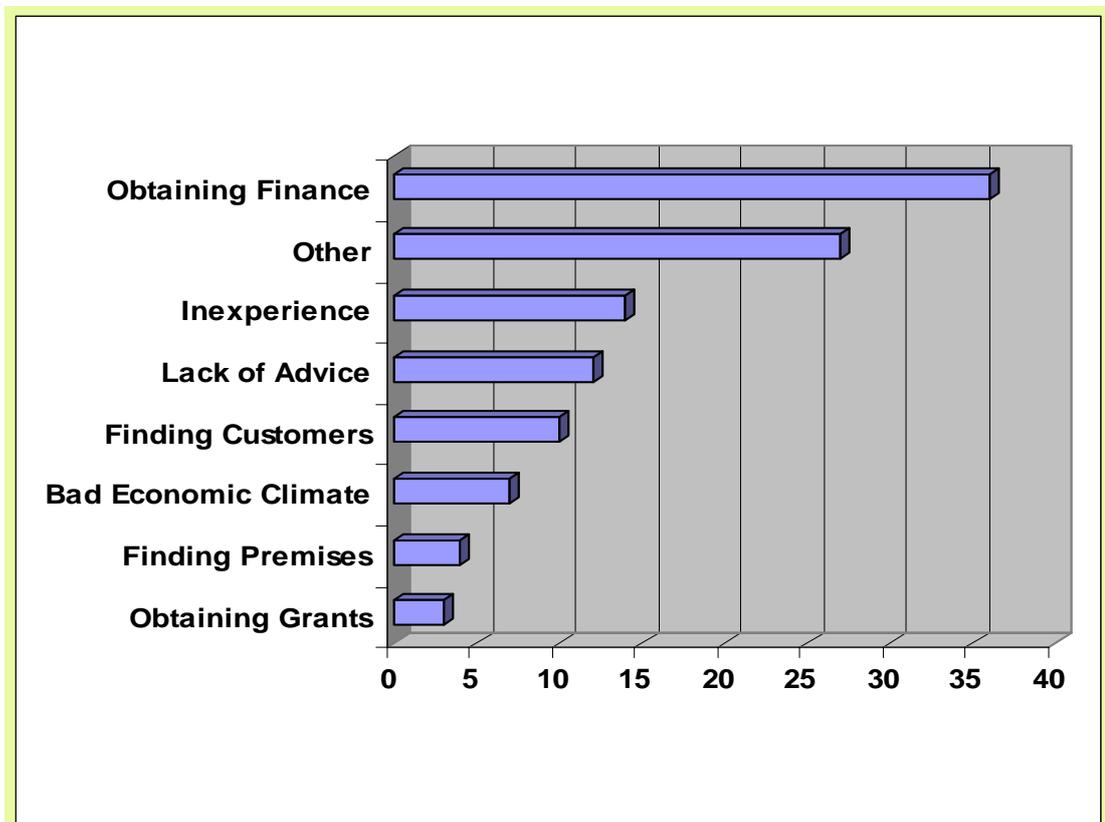


**Figure 1**   Main problems SME's face at the start

**Source:** McQuaid (2003)

Evans (2007) lists significant factors why SME's fail in their business. The SME's tend not to have a cohesive strategy for continuous improvement and innovation. According to Evans one reason for failure is the lack of systems for business accounting and control of business expenses and also lack of understanding

of working capital needs and cash flow management. Another reason for failure is the lack of general business acumen and core business management skills. One important reason behind failure is the lack of understanding of the market demand for the product or service offered. Another problem with understanding things is the lack of understanding of the value of family and other support mechanisms.  The are also certain skills that if they are missing or they are not strong can cause the failure of the business. These types of skills are the negotiation, influencing and sales skills. Also the lack of understanding of the importance of choice of location to the business can cause the business to fail. Sometimes even the growth can cause problems for SME's and the lack of ability to handle the challenges of growing the business might easily take to business out of business. Lack of focus, energy and persistence in the face of all types of challenges are points, which can cause the business failure.

Feindt *et al*. (2001) take another approach when assessing the success and failure possibilities of SMEs. They list factors that indicate success in business. First factor is the experience. An experienced owner-manager with a good knowledge of the market and industry has a good potential of success. Close contact with customers and a commitment to quality of product and/or service gives also possibilities for success. Better possibilities to do well in business if the owner manager can utilize innovation and can be flexible in marketing and technology. It is important to have the focus on profit not sales, with good management systems controlling costs. Success requires also attention to good employee relations, often backed by a bonus scheme. If the SME is operating in a growing market, that gives a better likelihood to success according to Feindt *et al.* (2001).

Storey (1994) provides a series of factors which appear common to start-up companies able to achieve growth. Successful companies demonstrate an ability to shift into (usually marginal) different product markets. In addition to that most growing companies recruit experienced management from outside. Marketing expertise is also critical for new companies with new products. Human resource management policies should link different parts of the small firm together, and encourage team working practices and flexible management systems. Businesses

which survive and grow tend to reinvest heavily in the company and take out few profits for personal consumption.  Successful companies should have good, long-term relationships with banks. This is helped by good financial management to track performance.  A shift away from overdrafts to longer term loans and equity investments by banks to allow more company stability. Owners of companies should also be more willing to invite outside investment from this and other sources.  Those companies which are successful tend to seek quality private sector advice from solicitors, accountants and management consultants.

The need for support to SME's has been recognized widely. The Confederation of the Finnish Industry and Employment has analyzed the situation and their result shows what external need the SME's need to prosper in current global business environment. The summary of the results is presented in Table 2.

**Table 2** Benefits and downsides of the networking for SME's

| Benefits | Downsides |
| --- | --- |
| More effective utilization of capacity | Variation of used capacity |
| Decreasing costs per unit | Variable time of delivery |
| Increase of flexibility and volatility of production processes | Inflexibility of the production processes |
| | Quality problems |
| Increase of reliability | Difficulties in cost management |
| More effective management of material flows and inventory | Difficulties in management of material flow |
| R& D Knowledge | Difficulties on management of information flow |
| Wider product and service offerings | |
| New innovation and business possibilities | Insufficient project management skills |
| | Other information barriers in production processes |
| Better quality of products and processes | |
| Better human resources focusing on the SME's own core competence | Lack/change of responsible persons |
| | Excessive competition |
| Better knowledge | Bad IT facilities |
| Develop the customer demand production | IT incompatibility problems between companies |
| Better focusing investments | Lack of trust |
| The visibility of production processes | Unfair contract terms and short term contracts |
| Environmental view in products and production | |
| | Negative attitude of the personnel |
| Easier to recruit staff | Problems in the relationships of personnel |
| Easier to become internationalized | |
| Easier to get financing | Difficult terms of agreement |
| Cost of financing decreases | Bad internationalization abilities |

**Source**: CFIE (2004)

To summarize the views of those represented above it is obvious that external knowledge would be beneficial to SME's.

**Research questions**

Based on the views presented in the previous chapters the research has been formulated based on the three dimensions as described in the Figure 2.
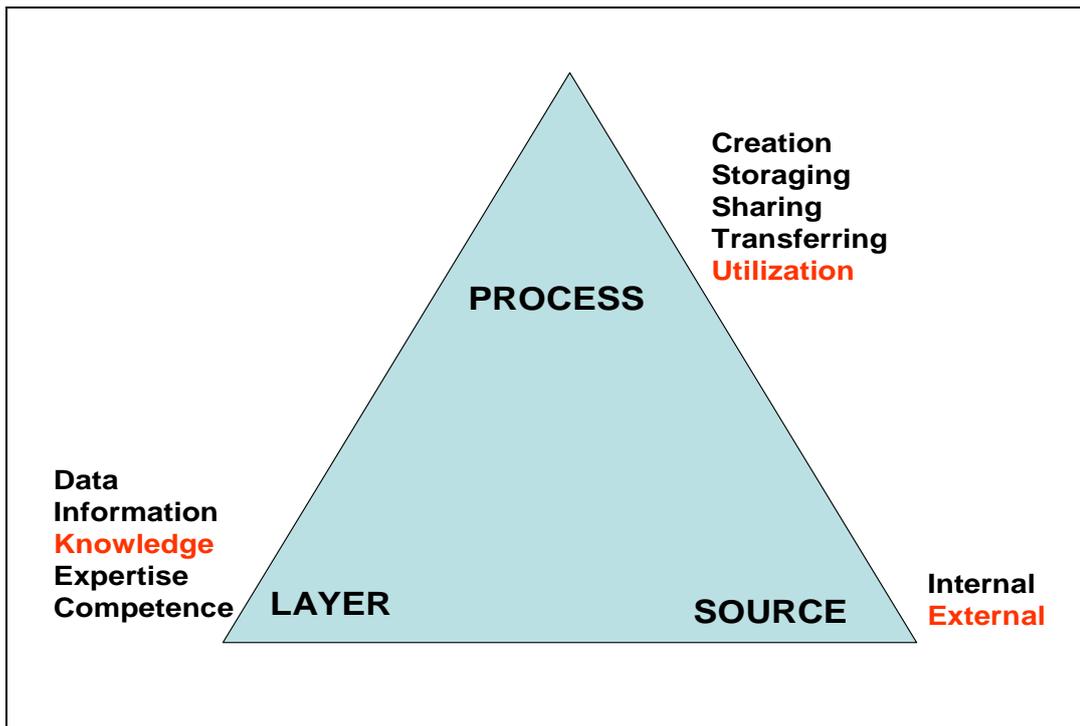


**Figure 2** The research framework

This research assumes the Knowledge Management phenomenon to be based on the three dimensions as in Figure 2. From this schematic presentation the layer in this research will be knowledge, the process is assumed to utilization and the source will be external.

This study has two major parts. First there is the analysis of the knowledge management as it has been defined and described in the literature – labeled as the literature review. The second part is the empirical where the taxonomy development is documented. The main interest of the study lies in the empirical part, but the examination of history and the state of the art in the Knowledge Management forms

an important basis for it. There is one main research questions examined in the literature review part of the study:

Q1: *What types of classifications have been used in knowledge transfer?*

The empirical part of the study is structured on the basis of another research question:

Q2: *What is the company external knowledge taxonomy that can be used to study external knowledge usage to the benefits of SME's?*

The purpose of the taxonomy is to use it to research like:

- What would be the right type of external knowledge to be used in certain phases of the life-cycle of the company, of the technology utilized by the company or of the products
- What kind of measurable effects can be achieved by using external knowledge for the benefit of the company
- What kind of measurable effects can be caused by using in a badly designed way the external knowledge?
- Comparing the usage of external knowledge by companies in different industries and/or in different countries.

**Problem statement**

One very recent sub-discipline of the Knowledge Management has aroused, so called KIBS - Knowledge-Intensive-Business-Services (Aslesen, 2004). KIBS's are expert companies that provide services to other companies and organizations. Actually KIBS as such does not say if it is a private or public service provider. But when discussing about KIBS as an industry, then it is assumed the provider to be a private company. IT services, R&D services, technical consultancy, legal, financial and management consultancy, and marketing communications are typical in KIBS

industries. KIBS businesses have aroused broad interest and several studies having indicated that they are active innovators, as well as facilitators and carriers of innovations of other companies. A futures perspective is essential from the viewpoint of innovation, and the study in hand intends to link this perspective to KIBS research. (Toivonen, 2004). One of the latest studies in this area has been the one from Toivonen (2004) and even that one takes the knowledge provided by these KIBS companies without any further categorizing than the list above. To simplify the paradigm of the KIBS research one could say that the KIBS are assumed to be useful for all companies (SME's in this case) in any given time.

To draw a narrower picture of the research arena one can think about a business person who is a knowledge seeker without essential knowledge. But there are also experts or business "stars", who are knowledge owners. Unfortunately their knowledge is in addition to explicit also tacit and not systematized and therefore not valid for immediate knowledge conversion. This tacit knowledge waits for externalization. In addition to that there is also knowledge outside the business itself, in spite of the context differences.

One of the key questions is: what is the right or correct knowledge for any given business at any given time? Arbnor and Bjerke (1996) discuss about knowledge audits for that purpose. Even after writing over 500 pages about 'Methodology for Creating Business Knowledge' they have to admit that "Conducting a knowledge audit is not one of the easiest activities, … It must be developed as a kind of thematic judgment or various methodological themes with reference to ultimate presumptions about what the knowledge within these themes is actually knowledge about in the relation to the knowledge fields and the business language of the corporation".

The classification of knowledge has long tradition. Aristotle over 2000 years ago presented his classification, which is still valid but difficult to use when studying the knowledge usage in SMEs. Classifications like: (1) Procedural knowledge, i.e. knowing how to do something (2) Declarative knowledge, i.e. knowing that something is true or false and (3) Tacit knowledge, i.e. unconscious knowledge, are

equally very little operational when it comes to research on causalities between the usage of knowledge and the performance of the SME. There is strong motivation to classify knowledge in a way in which the causalities can be evaluated.

Business supporting agencies, both public and private, have resources to help SME's by transferring knowledge. The challenge is how to know what knowledge at what time is most effective for the company in question. A taxonomy of the 'helping' (=external) knowledge makes it much easier to get these two parties work together.

**Research objective**

The objectives in this research project is to conceptualize and define the external knowledge necessary, useful, applicable and in all other ways valuable for the benefit of the small business success. The target is to make a definition that is applicable for various needs including but not limiting to:

- defining the knowledge not available inside the company, but possibly available externally
- defining the methods for the external knowledge acquisition
- valuing the external knowledge assets.

The objective is to fulfill the needs of both academic community and business practitioners in various business environments including, but not necessarily limiting in Finland, the USA and Thailand.

**Research framework**

Basic assumptions about the research can be described by elaborating the research paradigm:

1) The **research discipline** is the Industrial Engineering (IE). The body of knowledge of Industrial Engineering includes research areas like:

- manufacturing
- productivity
- TQM
- Systems engineering

Industrial Engineering integrates technological understanding and management and is clearly applied science in the classification of sciences.  Knowledge Management has been seen as a tool and a source of productivity increase in industry in general (Nielsen, 2005; Vayvay, 2005) and within SME's especially (Santos, 2005).

2)  The **ontological** assumptions are reflected by the literature review made and documented as part of this research.

3)  The **epistemological** assumptions of this research are rather interesting and a bit complex since the research is about knowledge - about (external) knowledge. Also the epistemological assumptions will be reflected by the literature research.

4)  The **research methods** applied in Industrial Engineering and Management have been classified by Olkkonen (1993). In the classification the research methods have been divided into two main categories: theoretical and empirical research. Theoretical research includes the following: concept analytical, theoretical modeling, theory modification, new theory generation and theoretical reviews. The empirical research includes classes: explorative research, explanatory research, descriptive research, experiments, predictive research, evaluations, developments and action research as well as constructive research.  This research falls into the concept analytical group of studies.

5)  The **ethics** of the researcher should be assessed based on this research document. The research was carried out jointly in the Finnish and Thai academic settings.  Because of the researchers background the guiding principles and the values of the Finnish Academic community will be highly influential.  This work is a collaborative exercise with a Thai university and supervised, controlled as well and approved by the Thai university system meeting therefore all quality criteria in that system. The research is also a collaborative exercise with experts from the USA. This has led to very open and transparent communication, which has been one of the guiding principles in this research.

Defining the research design means that it (Easterby-Smith et al., 2002; Emory, 1985; Alasuutari, 1995):

- specifies sources and types of information relevant to the research question
- is a blueprint specifying the approaches to be used for gathering and analyzing the desired data
- specifies what kind of sampling will be used, and
- explains how variables will be related.

Yin (1994) proposes a model for selecting the appropriate research strategy. This can be understood as research design. The model is presented in Table 3.

**Table 3** Relevant situations for different research strategies

| Strategy | Form of research question | Requires control over behavioral events? | Focuses on contemporary events? |
|---|---|---|---|
| Experiment | how, why | yes | yes |
| Survey | who, what, where, how many, how much | no | yes |
| Archival analysis | who, what, where, how many, how much | no | yes/no |
| History | how, why | no | no |
| Case study | how, why | no | yes |

**Source**: Yin (1994)

The research question of this study, *"what is the (SME / company) external knowledge taxonomy (or model or concept)"*, is a what question (as opposed to who, how, where, how many, or questions of how much); the research is focused on contemporary items and events, and the researcher has only some control over the events of the study. Thus Yin's typology would suggest a survey as well as an archival (=document) analysis, which both are used in this study.

Different research and data gathering methods all have their advantages and disadvantages, and no single correct method exists. Harrison (1994) has provided a good comparison of the different data gathering methods, suggesting that one method is not enough to build a meaningful theory on complex issues. The need to capture the perceptions of people calls for surveys and interviews. Such multi-approach research design also enhances the possibilities for effective triangulation. In this research the triangulation will be carried out between the survey, literature review and interviews. Triangulation is a combination of methods or viewpoints to enhance the validity of research results. In this study, both (within-method) data triangulation, i.e. collecting data from different sources with one method, and (between-method) method triangulation, i.e. using different methods, are used (Denzin, 1989; Easterby-Smith *et al*., 2002).

**Structure of the thesis**

The thesis starts with an Introduction where the reader is introduced to the research in question as well as outlines and situates the research setting and intention. In other words the basic paradigm of the researcher is self-assessed.

The next section is the literature review. In there the picture of the state of the art of the key elements of the theoretical background is presented. First there is the review of the Knowledge Management and some key aspect of it relevant to this research  The second topic covered by the literature review is the Knowledge classification, where several classifations are presented and later summarised. The next sections take a look at other knowledge management related topics relevant to the research. These include the  Leaning Organisations, Knowledge Intensive Business Services, Resource based theory of the firm and Outsourcing.

The empirical part starts with the material and methods describing the research methodology applied in this research. The results from the empiric material are combined with the literature-based understanding creating the taxonomy of the

company External Knowledge.  In the empirical part also some analysis is made about the utilization of the external knowledge by companies through the life cycle.

Finally the quality of the research and its outcome is tested. The results are tested with a survey of 20 SME's from four different industry sectors in order to prove the validity of the taxonomy. The second test is made with two case companies with a deeper analysis of their usage of external knowledge throughout the transition from one stage to another in their life cycle.

The work is closed with conclusions and recommendations for further work in the area of managing external knowledge.

The research started in the beginning of 2004 with the literature review and with planning of the surveys and the interviews in Finland.  The pahses of research project is presented in time scale in the Figure 3.

From the initial idea in the early 90's until the completion in 2007 the time span is close to 15 years. The research idea got the from of a doctoral dissertation in 2003 and the research project started in 2004. The total duration of the research is close to four years.
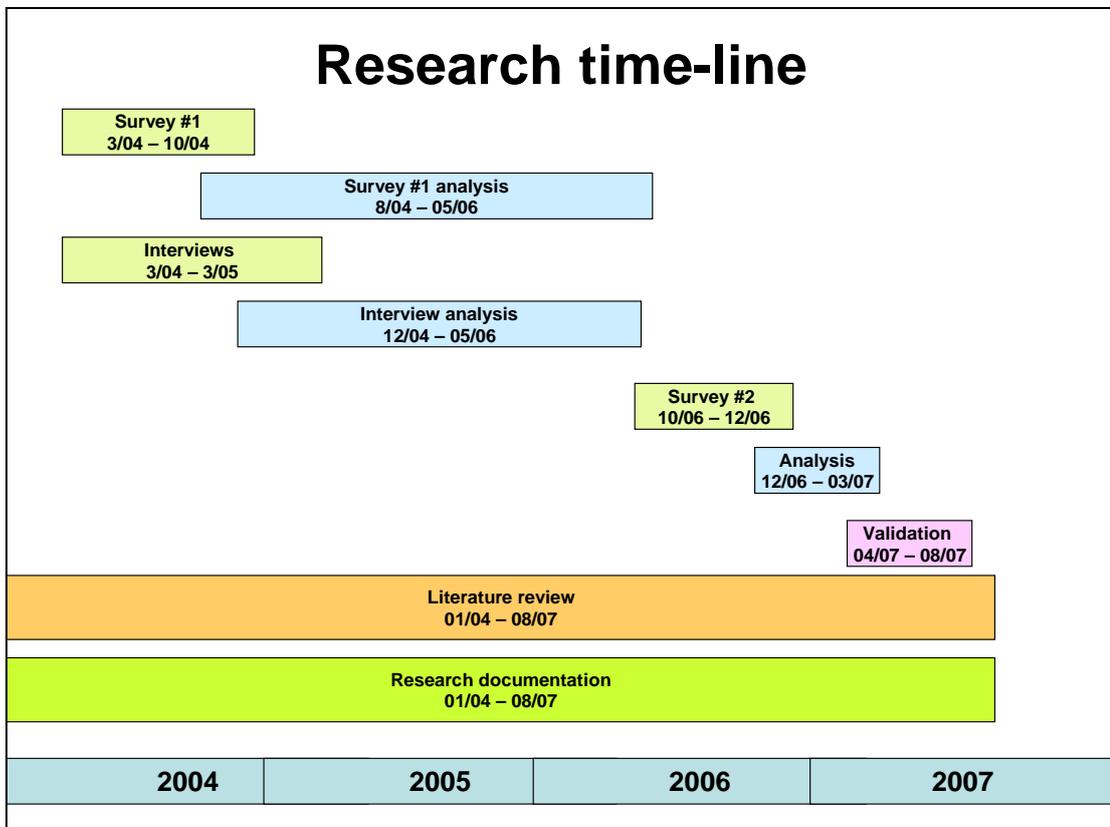
**Figure 3** The research project time-line

# LITERATURE REVIEW

## Introduction

The title of the research as well the research approach selected asks for the identification of some key concepts. In the following paragraphs some of those are defined in order to tune the reader and the author into same tone.

**A Taxonomy** is a hierarchical organization for sets of objects. Taxonomies are used to group similar kinds of things together, placing more general definitions at the top of the hierarchy and more specific ones at lower nodes in the taxonomy. Classifying data to an internationally supported taxonomy ensures that data is transferable. (XSB, 2006) Taxonomies can in addition to hierarchical structures be also flat, faceted or networks. Hierarchical taxonomies group content into two or more levels. They resemble tree structures when they are fully elaborated. Relationships among categories have a particular meaning. There are no inherent relationships among the categories in a faceted taxonomy. It can represented as a star structure where each node in the star structure is linked to the center focus. Network taxonomies organize content in both hierarchical and associative categories. Flat taxonomies group content into controlled set of categories. All these taxonomies can be either explicit or implicit. (Bedford, 2003) In this research a structuring of a three level hierarchical taxonomy is the research target.

**Company** (WorldNet, 2004) is an institution to conduct activities of providing goods and services involving financial and commercial and industrial aspects. In this research company is seen as a legal entity, allowed by legislation, which permits a group of people, as shareholders, to create an organization it can then focus on perusing set objectives, and empowered with legal rights. The primary advantage of a company structure being that it provides the shareholders with a right to participate in the profits without any personal liability. (Duhaime, 2004). In this research it is implicitly assumed that everyone involved in this research understands company in

general as defined above. This definition applies equally to SMEs as it does to all other sizes of companies.

**Knowledge** is simply what is known. Like the related concepts truth, belief, and wisdom, there is no single definition of knowledge on which scholars agree, but rather numerous theories and continued debate about the nature of knowledge. Knowledge acquisition involves complex cognitive processes: perception, learning, communication, association, and reasoning. The term *knowledge* is also used to mean the confident understanding of a subject, potentially with the ability to use it for a specific purpose. The definition of knowledge is a live debate for philosophers. The classical definition has it that in order for there to be knowledge at least three criteria must be fulfilled; that in order to count as knowledge, a statement must be justified, true, and believed. Some claim that these conditions are not sufficient. Wittgenstein sought to bypass the difficulty of definition by looking to the way "knowledge" is used in natural languages. He saw knowledge as a case of a family resemblance.

Because any knowledge incorporates concepts and will be expressed using terms, the interdependencies between knowledge and language are essential for the definition itself. (Knowledge, 2007)

Knowledge being the key concept in this research will be discussed more extensively in the coming chapters.

Data - Information - Knowledge - Expertise - Capability

Data, information, knowledge, expertise and capability form a hierarchical structure of concepts (Figure 4). Aamodt and Nygård (1995) define the triple: data – information – knowledge as follows:

- **Data** are syntactic entities. Data are patterns with no meaning; they are input to an interpretation process, i.e. to the initial step of decision making.

- **Information** is interpreted data. Information is data with meaning; it is the output from data interpretation as well as the input to, and output from, the knowledge-based process of decision making.

- **Knowledge** is learned information. Knowledge is information incorporated in an agent's reasoning resources, and made ready for active use within a decision process; it is the output of a learning process.

The hierarchy could be extended from both ends. The (business) world is full of noise. That is there are items that are of no interest to the business in question. In business (research) context this noise should be eliminated before obtaining data. At the other end there is meta-knowledge which is knowledge about knowledge. Marquardt (2002) extends the hierarchy 'upper-end' to 'expertise' and to 'capability' (Manaves, 2006). The hierarchical relationships between data, information, knowledge, expertise and capability are illustrated in Figure 4 (Aamodt and Nygård, 1995; Marquardt, 2002; Manaves, 2006).
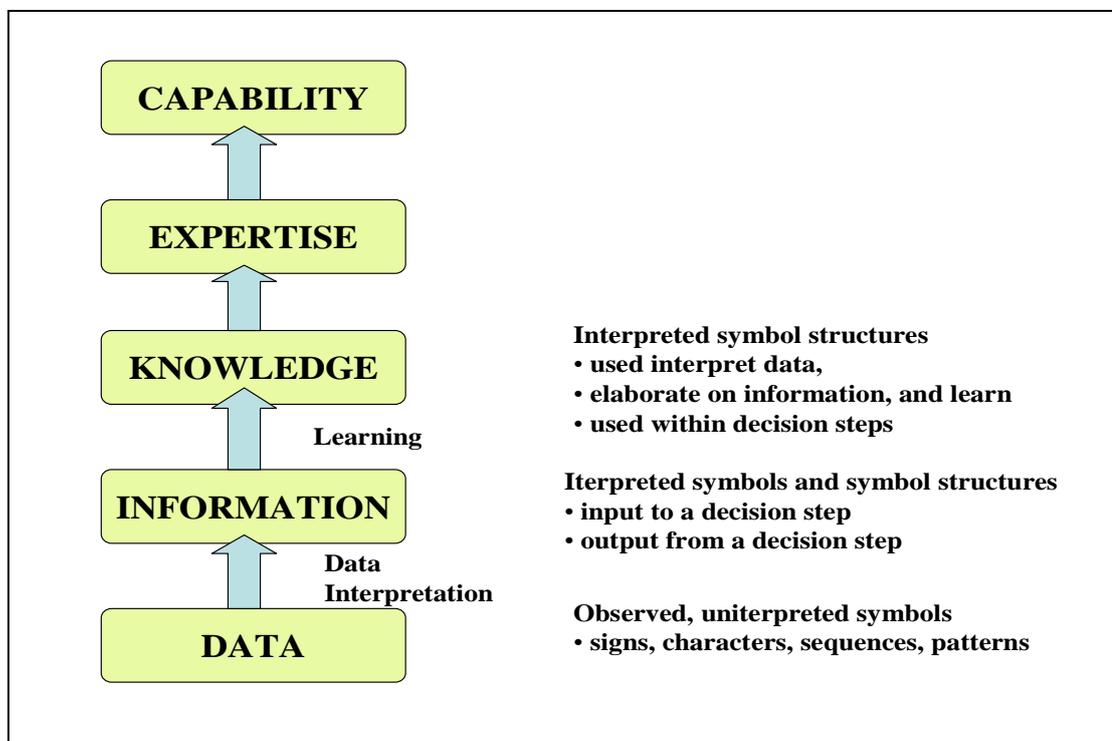


**Figure 4** The hierachy of concepts

Boissot (1983) has conceptualized the relationship of data, information and knowledge rather differently. His concept is presented in the Figure 5.
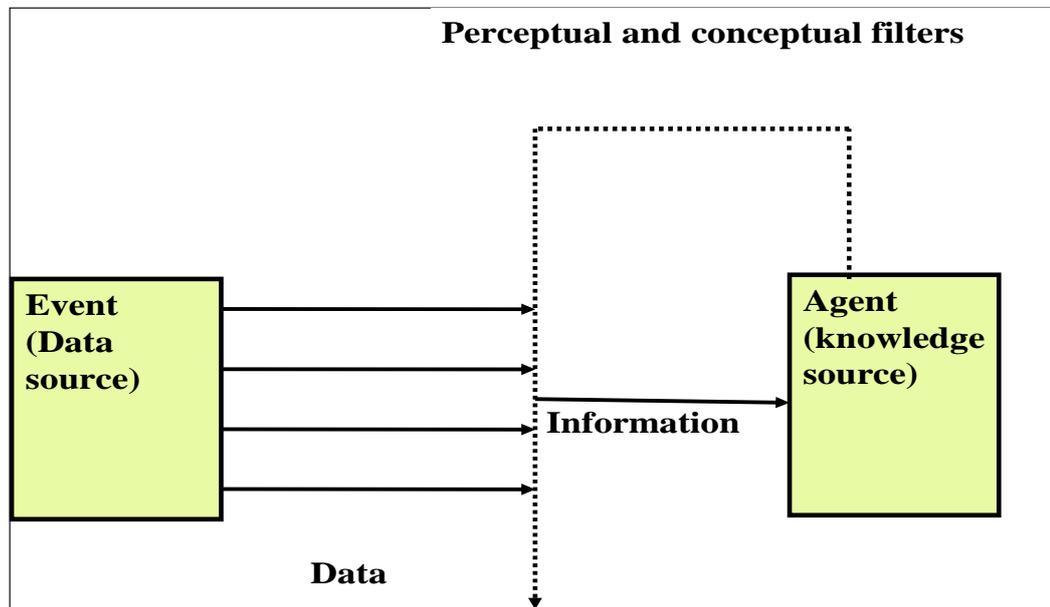


**Figure 5** The Data – Information – Knowledge

Knowledge is an interesting concept. In this research it is tried to build new knowledge about (external) knowledge. Epistemology is the study of the nature and validity of knowledge (Encyclopædia Britannica, 1982).

The External Knowledge

Some researchers have argued that new knowledge is created in interaction with other people or other firms (Powell *et al*. 1996; Tsoukas, 1996) and suggested that a firm's ability to interact with other firms and acquire knowledge is a distinctive competence that can yield competitive advantage (Leonard-Barton, 1992; Lorenzoni and Lipparini, 1999; Takeishi, 2001). Despite the acknowledgement that knowledge resides inside the organization as well as outside, the body of research encompassing external knowledge is limited (Matusik, 2002). Many researchers have acknowledged the limited utility of the knowledge residing in the firm boundaries and the need to integrate it with the knowledge existing outside the firm boundaries (Anand *et al*.,

1998; Bierly and Chakrabarti, 1996). However, only few scholars, notably Appleyard (1996) and Matsuik (2002), have tried to develop a typology of knowledge based on the boundaries of a firm. Using the insights from their studies and other empirical studies which examined the interaction of firm with its environment for knowledge acquisition, the typology of knowledge is developed in this research.

Knowledge resides both within and outside the firm boundaries. Here it is referred to the knowledge that resides within the firm boundaries as *internal knowledge* and the knowledge that resides outside the firm boundaries as *external knowledge*. The access to and usage of knowledge is restricted when it is in the private domain whereas it is not restricted if it is in the public domain.

It is assumed that all the knowledge that resides in a firm (internal knowledge) is accessible to its employees. However, certain parts of it such as annual reports, press statements, achievements, and best practices are usually codified and remain in the public domain. Yet, a large part of an organization's knowledge lies in its private domain and includes both explicit and tacit knowledge. An organization's explicit knowledge is codified in the formal procedures and routines, policy statements, and databases.

An organization's tacit knowledge in the private domain is contained in the belief structures, management practices, and informal routines. An organization can manage its explicit knowledge through investments in technology but managing tacit knowledge requires investments in social processes such as communication and coordination (Anand *et al.*, 1998). This requires from the organization a working management systems like discussed in Oiva (2007)

The knowledge that is external to a firm is held by outside agencies, such as suppliers, customers, competitors, industry associations, and research communities (Powell *et a*l., 1996; Takeishi, 2001). Similar to internal knowledge, external knowledge too resides in both public and private domains. The external knowledge that lies in the public domain is accessible to the firm. However, the external

knowledge in the private domain is not available to firm. Such knowledge includes values of the firms, management practices, informal rules, projects under exploration, and their experiences. Much of such knowledge would be in the tacit form and will be revealed only in the organizational context and in the organizational action (Cook and Brown, 1999; Orlikowski, 2002). Therefore, such knowledge can only be acquired through communication, social interaction, and relationships (Lorenzoni and Lipparini, 1999; Takeishi, 2001; Yli- Renko *et al.*, 2001).

### The Importance of the External Knowledge

It is important for firms to access external knowledge for two reasons: first, to create new knowledge and second, to avoid learning traps due to excessive reliance on internal knowledge.

The argument that firms (SMEs especially) depend on sources outside of their boundaries for knowledge has been empirically established in the literature. For example, firms across industries in Norway formed a network to learn from each other and develop a common knowledge base to deal with hyper competition (HanssenBauer and Snow, 1996). It was found that firms access knowledge through interactions and relationships of employees with those outside the firm (Almeida and Kogut, 1999; Saxenian, 1990), by hiring former employees of competitors (Almeida and Kogut, 1999), and from public sources such as presentations at conferences, journals, books and patents within an industry (Appleyard, 1996). Firms also access knowledge through their relationships with other companies (Lane and Lubatkin, 1998; Zollo *et al.*, 2002), suppliers (Lorenzoni and Lipparini, 1999; Takeishi, 2001), universities and research institutions (Lee *et al.*,2001; Powell *et al.*, 1996), industry associations/ networks (HanssenBauer and Snow, 1996; Lee *et al.*, 2001), and with customers (Yli-Renko *et al.*, 2001).

Empirical evidence indicates that external knowledge helps an organization to create new knowledge (Bierly and Chakrabarti; 1996, Danneels, 2002; Mowery *et al.*,

1996). Additionally, it helps organizations better utilize their internal knowledge. For example, Lee *et al.*, (2001) found that the performance benefits from internal knowledge capabilities are higher in the presence of external linkages and the knowledge gained from them (Lee *et al.*, 2001). Learning from one's own experience may not always be productive because it tends to pay over attention to short-term and local conditions. Learning from the experience of the industry can offset the risks involved in learning from one's own experience (Baum and Ingram, 1998; Ingram and Baum, 1997). Empirical evidence from the chemical industry points that organizations can avoid the learning traps by employing the emerging, novel, and pioneering technologies (Ahuja and Lampert, 2001). Further empirical evidence points that older firms in the high-tech industries build on previous innovations but their new innovations do not influence the technology as much as their younger competitors' innovations (Sorensen and Stuart, 2000). These studies underscore the importance of accessing external knowledge to overcome learning traps.

All together it is easy to argue that is important for firms to manage the external knowledge. It helps them to create new knowledge and to avoid learning traps. Firms, therefore, make efforts to access the knowledge residing outside their boundaries. (Bapuji, 2003) We argue that the content and volume of these efforts is not fully capitalized because the concept of external knowledge has so far been fuzzy from the utilization points of view.

Competence

Competence means the possession of a satisfactory level of relevant knowledge and acquisition of a range of relevant skills that include interpersonal and technical components at a certain point in the educational process. Such knowledge and skills are necessary to perform the tasks that reflect the scope of professional practices. Competence may differ from "performance", which denotes actions taken in a real life situation. Competence is therefore not the same as "knowing" on the contrary, it may well be about recognizing one's own limits. The more experienced the professional being tested, the more difficult it is to create a tool to assess their

actual understandings and the complex skills of the tasks they undertake. A holistic integration of understandings, abilities and professional judgments i.e. a "generic" model, is one where competence is not necessarily directly observable, but rather can be inferred from performance. (Glossary of Medical Terms, 2005)

Competence is an underlying characteristics (meaning that competency is fairly deep and enduring part of a person's personality) of an individual that is causally related (meaning that the competency causes or predicts who does something well or poorly) to criterion-referenced effective and/or superior performance in a job or situation.

Spencer and Spencer (1993) have defined an interesting list of 20 different competencies, which belong to five clusters as follows:

Achievement and action
1. Achievement orientation
2. Concern for order, quality and accuracy
3. Initiative
4. Information seeking

Helping and human service
5. Interpersonal understanding
6. Customer service orientation

Impact and influence
7. Impact and influence
8. Organizational awareness
9. Relationship building

Managerial
10. Developing others
11. Defectiveness: assertiveness
12. Teamwork and cooperation
13. Team lead

Cognitive

14. Analytical thinking

15. Conceptual thinking

16. technical/professional/managerial expertise

Personal effectiveness

17. Self-control

18. Self-confidence

19. Flexibility

20. Organizational commitment

Quinn *et al.*, (1996) have also defined three competencies for each leadership role in their competing values framework. There are altogether 24 competencies:

Mentor role

1. Understanding self and others

2. Communicating effectively

3. Developing subordinates

Facilitator role

1. Building teams

2. Using participative decision making

3. Managing conflict

Monitor role

1. Monitoring individual performance

2. Managing collective performance

3. Managing organizational performance

Coordinator role

1. Managing projects

2. Designing work

3. Managing across functions

Director role

1. Visioning, planning and goal setting

2. Designing and organizing

3. Delegating effectively

Producer role

1. Working productively

2. Fostering a productive work environment

3. Managing time and stress

Broker role

1. Building and maintaining a power base

2. Negotiating agreement and commitment

3. Presenting ideas

Innovator role

1. Living with change

2. Thinking creatively

3. Creating change

Competencies can be divided into two categories: "threshold" and "differentiating" according to the job performance criterion they predict (Spencer and Spencer 1993). Threshold means the minimum level of competency that is required to perform certain organizational tasks, duties and actions. The differentiating level of competency gives the person or the company a competitive advantage which is based on that competency. The competitive advantage comes from the differentiation.

Talent

Exactly What Is Talent? Knowledge and skills can be learned, but talent is enduring defines Management Journal (2000). The concept of talent is elusive -- it lacks substance, specificity. What is that distinguishes talent from related -- but very different -- concepts, such as competency or style? Talent refers to a special aptitude, faculty or gift of a person. The word comes from the Greek word "Τάλαντο" meaning balance or weight. (My Voice, 2007)

Skill

A skill is the ability or talent to perform a task well or better than average (Skill, 2007). Skill can defined as being an ability that has been acquired by training. Skill is also ability to produce solutions in some problem domain. This means that skill requires knowledge, but knowledge is not sufficient requirement to build skills.

Hans Renold in 1928 defined skill as .any combination, useful to industry, of mental and physical qualities which require considerable training to acquire. (Winterton, 2005). Renold was therefore introducing a cognitive dimension alongside the manual, his emphasis on training ignores the fact the skills may equally be acquired through practice, without training. Usually the term skill is used to refer to a level of performance, in the sense of accuracy and speed in performing particular tasks. Bryan and Harter (1897, 1899), demonstrated that skill acquisition involves a series of stages associated with reaching plateaux of performance and that improvements continue well beyond the achievement of an adequate level.

Welford (1968) has defined skill as a combination of factors resulting in .competent, expert, rapid and accurate performance., regarded this as equally applicable to manual operations and mental activities.

Fitts and colleagues (Fitts *et al.*, 1961; Fitts and Posner, 1967) have developed a three stage framework for skill acquisition: (i) the cognitive phase of understanding the nature of the task how it should be performed involves conscious cognitive processes; (ii) the associative phase involves inputs linked more directly to appropriate actions and reduced interference from outside demands and finally (iii) the autonomous phase occurs when actions are .automatic. requiring no conscious control. Based on this approach, Anderson (1981, 1982, 1983, 1987) developed a framework for the acquisition of cognitive skill in which the declarative and procedural phases correspond with Fitt's cognitive and autonomous phases.

Proctor and Dutta (1995) define skill as .goal-directed, well-organized behavior that is acquired through practice and performed with economy of effort. They distinguish perceptual skills, response selection skills, motor skills and problem-solving skills.

**Knowledge Management**

Introduction

Knowledge management can be defined as a business activity with two primary aspects (Barclay and Murray, 1997). First of all Knowledge Management means treating the knowledge component of business activities as an explicit concern of business reflected in strategy, policy, and practice at all levels of the organization. Secondly Knowledge Management means making a direct connection between an organization's intellectual assets — both explicit and tacit — and positive business results.

In practice, knowledge management often encompasses identifying and mapping intellectual assets within the organization, generating new knowledge for competitive advantage within the organization, making vast amounts of corporate information accessible, sharing of best practices, and technology that enables all of the above — including groupware and intranets. (Barclay and Murray, 1997).

Viitala (2005) has made an analysis on the questions and concepts related to the Knowledge Management in the literature. The results of the analysis are summarized in Table 4.

**Table 4** Knowledge Management Classification

| Questions to be answered | Concepts and terms used | Authors |
|---|---|---|
| What should be known? What knowledge should be fostered? | Strategic knowledge Core capability Core competence | Peters and Waterman (1980), Prahalad and Hamel (1990), Stalk et al (1992), Leonard-Barton (1992), Long and Vickers-Koch (1995), Sanches and Heene (1997) |
| Where the knowledge can be found? How does learning happen? Where knowledge will stay? | Intangible Assets Intellectual Capital Knowledge Capital Human Capital | Stewart (1997), Edvinsson and Malone (1997), Sveiby (1997), Ulrich (1997) Becker et al (2001) Ullrich and Smallwood (2003) Ullrich and Brockbank (2005) |
| How does the organizational knowledge build up? | Organizational learning | Argyris and Schön (1978), Woolner (1991), Crossan et al (1999), Garvin (1993) Nonaka and Takeuchi (1995) |
| What type of organization supports learning at its best? | The Learning Organization | Senge (1994) Peddler et al (1991) McGill and Slocum (1993) |
| What type if systematic and IT systems knowledge creation can be supported? | Knowledge management Organizational memory | Walsh and Ungson (1991, 1997) Ruggles (1998) Zack (1999) Coates (1999) |
| What kind of management supports knowledge development and renewal? | Learning supporting management Transformational Management Coaching management | Senge (1994) Bass (1990) Ellinger and Bostrom (1999) |

**Source:** Viitala (2005)

A significant element of the business community also views knowledge management as a natural extension of "business process reengineering, .There is a common thread among these and many other recent business strategies: recognition that information and knowledge are corporate assets, and that businesses need strategies, policies, and tools to manage those assets. (Barclay and Murray, 1997)

The need to manage knowledge seems obvious, and discussions of intellectual capital have proliferated, but few businesses have acted on that understanding. Where companies have take action - and a growing number are doing so -  implementations of "knowledge management" may range from technology driven methods of accessing, controlling, and delivering information to massive efforts to change corporate culture. (Barclay and Murray, 1997)

Knowledge has two basic definitions of interest. The first pertains to a defined body of information. Depending on the definition, the body of information might consist of facts, opinions, ideas, theories, principles, and models (or other frameworks). Clearly, other categories are possible, too. Subject matter (e.g., chemistry, mathematics, etc.) is just one possibility. (Barclay and Murray, 1997)

Barson *et al*. (2000) have defined the Knowledge Management to be structured as presented in the Figure 6.
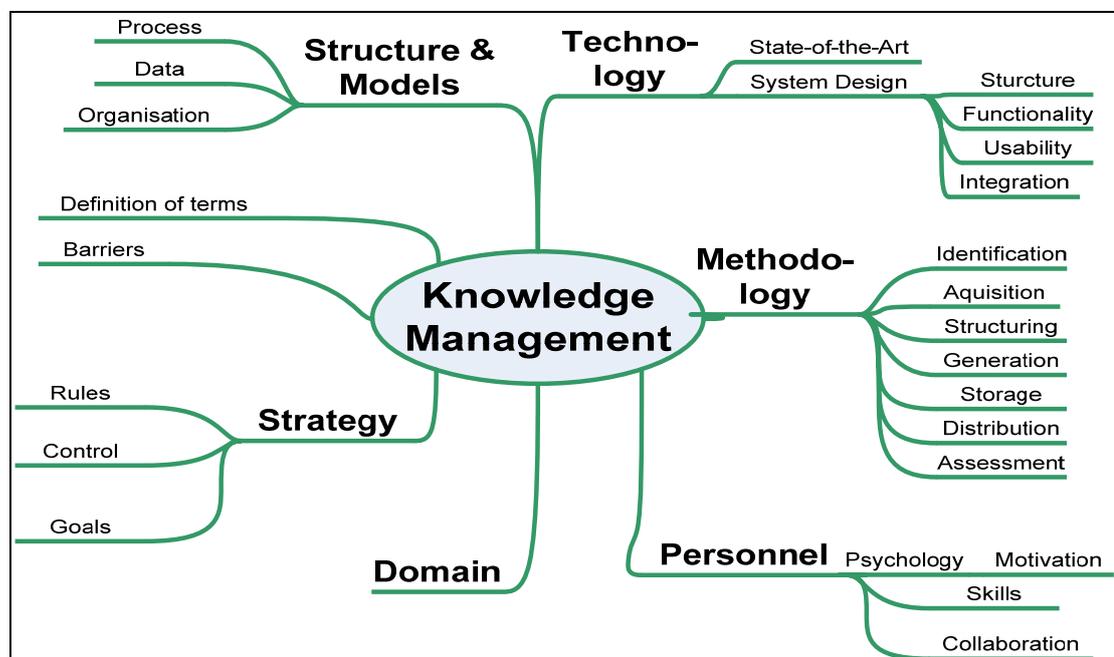


**Figure 6**  The Elements of the Knowledge Management
**Source**: Barson *et al*. (2000)

Historical view on the Knowledge Management

An overarching theory of knowledge management has yet to emerge, perhaps because the practices associated with managing knowledge have their roots in a variety of disciplines and domains. (Barclay and Murray, 1997)

A number of management theorists have contributed to the evolution of knowledge management, among them are management 'gurus' like Drucker, Strassmann, and Senge. Drucker and Strassmann have stressed the growing importance of information and explicit knowledge as organizational resources, and Senge has focused on the "learning organization," a cultural dimension of managing knowledge. Argyris, Bartlett, and Leonard-Barton have examined various facets of managing knowledge. In fact, Leonard-Barton's well-known case study of Chaparral Steel, a company which has had an effective knowledge management strategy in place since the mid-1970s, and is documented well by Leonard-Barton (1995) (Barclay and Murray, 1997).

E. Rogers' work at Stanford in the diffusion of innovation and T. Allen's research at MIT in information and technology transfer, both of which date from the late 1970s, have also contributed to the understanding of how knowledge is produced, used, and diffused within organizations. By the mid-1980s, the importance of knowledge (and its expression in professional competence) as a competitive asset was apparent, even though classical economic theory ignores (the value of) knowledge as an asset and most organizations still lack strategies and methods for managing it. (Barclay and Murray, 1997)

Recognition of the growing importance of organizational knowledge was accompanied by the concern over how to deal with exponential increases in the amount of available knowledge and increasingly complex products and processes. The computer technology that contributed so heavily to superabundance of information started to become part of the solution, in a variety of domains. D. Engelbart's Augment (for "augmenting human intelligence"), which was introduced

in 1978, was an early hypertext/groupware application capable of interfacing with other applications and systems. R. Acksyn's and D. McCracken's Knowledge Management System (KMS), an open distributed hypermedia tool, is another notable example and one that predates the World Wide Web by a decade. (Barclay and Murray, 1997)

The 1980s also saw the development of systems for managing knowledge that relied on work done in artificial intelligence and expert systems, giving us such concepts as "knowledge acquisition," "knowledge engineering," "knowledge-base systems, and computer-based ontologies. (Barclay and Murray, 1997)

The phrase "knowledge management" entered the lexicon when a consortium of U.S. companies started the Initiative for Managing Knowledge Assets in 1989. Knowledge management-related articles began appearing in journals like *Sloan Management Review*, *Organizational Science*, *Harvard Business Review*, and others, and the first books on organizational learning and knowledge management were published (Barclay and Murray, 1997)

By 1990, a number of management consulting firms had begun in-house knowledge management programs, and several well known U.S., European, and Japanese firms had instituted focused knowledge management programs. Knowledge management was introduced in the popular press when Stewart (1991) published "Brainpower" in *Fortune* magazine. Perhaps the most widely read work to date is Nonaka's and Takeuchi's *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation* (1995). (Barclay and Murray, 1997)

By the mid-1990s, knowledge management initiatives were flourishing, thanks in part to the Internet. The International Knowledge Management Network (IKMN), begun in Europe in 1989, went online in 1994 and was soon joined by the U.S.-based Knowledge Management Forum and other KM-related groups and publications. The number of knowledge management conferences and seminars is growing as organizations focus on managing and leveraging explicit and tacit knowledge

resources to achieve competitive advantage. In 1994 the IKMN published the results of a knowledge management survey conducted among European firms, and the European Community began offering funding for KM-related projects through the ESPRIT program in 1995. (Barclay and Murray, 1997)

Knowledge management, which appears to offer a highly desirable alternative to failed TQM and business process re-engineering initiatives, has become big business for such major international consulting firms as Ernst & Young, Arthur Andersen, and Booz-Allen & Hamilton. In addition, a number of professional organizations interested in such related areas as benchmarking, best practices, risk management, and change management are exploring the relationship of knowledge management to their areas of special expertise (for example, the APQC - American Productivity and Quality Council  and ASIS  - American Society for Information Science). (Barclay and Murray, 1997)

The aim of this research is to become part of this history of Knowledge Management by bringing some engineering flavor into the structuring to the key element of the KM discipline.

The Cross – disciplinary nature of the Knowledge Management

Knowledge management draws from a wide range of disciplines and technologies (Barclay and Murray, 1997):

- Cognitive science. Insights from how we learn and know will certainly improve tools and techniques for gathering and transferring knowledge.
- Expert systems, artificial intelligence and knowledge base management systems (KBMS). AI and related technologies have acquired an undeserved reputation of having failed to meet their own — and the marketplace's — high expectations. In fact, these technologies continue to be applied widely, and the lessons practitioners have learned are directly applicable to knowledge management.

- Computer-supported collaborative work (groupware). In Europe, *knowledge management* is many times considered almost synonymous with *groupware*. Sharing and collaboration are clearly vital to organizational knowledge management — with or without supporting technology.

- Library and information science. The body of research and practice in classification and knowledge organization that makes libraries work will be even more vital as we are inundated by information in business. Tools for thesaurus construction and controlled vocabularies are already helping in managing knowledge.

- Technical writing. Also under-appreciated — even sneered at — as a professional activity, technical writing (often referred to by its practitioners as *technical communication*) forms a body of theory and practice that is directly relevant to effective representation and transfer of knowledge.

- Document management. Originally concerned primarily with managing the accessibility of images, document management has moved on to making content accessible and re-usable at the component level. Early recognition of the need to associate "meta information" with each document object prefigures document management technology's growing role in knowledge management activities.

- Decision support systems. Researchers working on Decision Support Systems have brought together insights from the fields of cognitive sciences, management sciences, computer sciences, operations research, and systems engineering in order to produce both computerized artifacts for helping knowledge workers in their performance of cognitive tasks, and to integrate such artifacts within the decision-making processes of modern organizations. That already sounds a lot like knowledge management, but in practice the emphasis has been on quantitative analysis rather than qualitative analysis, and on tools for managers rather than everyone in the organization.

- Semantic networks. Semantic networks are formed from ideas and typed relationships among them — sort of "hypertext without the content," but with far more systematic structure according to meaning. Often applied in such arcane tasks as textual analysis, semantic nets are now in use in mainstream professional applications, including medicine, to represent domain knowledge in an explicit way that can be shared.

- Relational and object databases. Although relational databases are currently used primarily as tools for managing "structured" data — and object-oriented databases are considered more appropriate for "unstructured" content — we have only begun to apply the models on which they are founded to representing and managing knowledge resources.

- Simulation. Knowledge Management expert Sveiby has suggested "simulation" as a component technology of knowledge management, referring to "computer simulations, manual simulations as well as role plays and micro arenas for testing out skills."

- Organizational science. The science of managing organizations increasingly deals with the need to manage knowledge — often explicitly.

In this research the research question and the approach are putting this work close to the disciplines of Expert Systems and KBMS but not to forget the organizational science either.  It would be fair to say that answering the research question proposed in this research would give answers to all disciplines.

Various perspectives on the Knowledge Management

De Long and Seeman (2000) have observed several distinct perspectives on knowledge management. They claim that these perspectives should be integrated if any kind of long term strategy would be implemented. The four defined perspectives are:

1. Strategy / leadership perspective. Senior management sees knowledge management primarily in terms of how it supports strategic business objectives, and the capital market's perception of related intangible assets.

2. Knowledge content / practice perspective. This view is held by experienced line-managers who are the most concerned with what knowledge is to be managed and how it is actually applied in practice.

3. Technology perspective. This view is taking by those in IT roles, who view knowledge management as a product of applying ICT.

4. Change management / re-engineering perspective. This view is taken by OD and HR specialists or internal experts on business process re-engineering. This view emphasizes the change in the work design, organizational structure and culture necessary to leverage knowledge.

De Long and Seeman (2000) put things even more complex by saying that there can be considerable variation within these perspectives such as differences between individuals with the re-engineering view of change management and those who focus on behavioral change. In this research the knowledge content and practice perspective is dominating.

Knowledge Management approaches

The term "knowledge management" is now in widespread use, having appeared in the titles of many new books about knowledge management as a business strategy, as well as in articles in many business publications. There are, of course, many ways to slice up the multi-faceted world of knowledge management. However, it's often useful to categorize them. (Barclay and Murray, 1997)

In a posting to the Knowledge Management Forum, Sveiby identified two "tracks" of knowledge management (Barclay and Murray, 1997):

- Management of Information. To researchers in this track, according to Sveiby, "… knowledge = Objects that can be identified and handled in information systems."
- Management of People. For researchers and practitioners in this field, knowledge consists of "… processes, a complex set of dynamic skills, know-how, etc., that is constantly changing."

Sveiby's characterization is on target, but it may not capture the full flavor of the important distinctions in approaches to organizational knowledge management. At *Knowledge Praxis,* a three-part categorization has been adopted: (1) mechanistic approaches, (2) cultural/behavioristic approaches, and (3) systematic approaches to knowledge management. (Barclay and Murray, 1997)

**Mechanistic approaches** to knowledge management are characterized by the application of technology and resources to do more of the same better. The main assumptions of the mechanistic approach include (Barclay and Murray, 1997):

- Better accessibility to information is a key, including enhanced methods of access and reuse of documents.
- Networking technology in general (especially intranets), and groupware in particular, will be key solutions.
- In general, technology and sheer volume of information will make it work.

**Cultural/behavioristic approaches**, with substantial roots in process re-engineering and change management, tend to view the "knowledge problem" as a management issue. Technology — though ultimately essential for managing explicit knowledge resources — is not the solution. These approaches tend to focus more on innovation and creativity (the "learning organization") than on leveraging existing explicit resources or making working knowledge explicit. (Barclay and Murray, 1997)

Assumptions of cultural/behavioristic approaches often include (Barclay and Murray, 1997):

- Organizational behaviors and culture need to be changed … dramatically. In our information-intensive environments, organizations become dysfunctional relative to business objectives.
- Organizational behaviors and culture can be changed, but traditional technology and methods of attempting to solve the "knowledge problem" have reached their limits of effectiveness. A "holistic" view is required. Theories of behavior of large-scale systems are often invoked.

- It's the processes that matter, not the technology.

- Nothing happens or changes unless a manager makes it happen.

**Systematic approaches** to knowledge management retain the traditional faith in rational analysis of the knowledge problem: the problem can be solved, but new thinking of many kinds is required. Some basic assumptions (Barclay and Murray, 1997):

- It is sustainable results that matter, not the processes or technology … or your definition of "knowledge."

- A resource cannot be managed unless it is modeled, and many aspects of the organization's knowledge can be modeled as an explicit resource.

- Solutions can be found in a variety of disciplines and technologies, and traditional methods of analysis can be used to re-examine the nature of knowledge work and to solve the knowledge problem.

- Cultural issues are important, but they too must be evaluated systematically. Employees may or may not have to be "changed," but policies and work practices must certainly be changed, and technology can be applied successfully to business knowledge problems themselves.

- Knowledge management has an important management component, but it is not an activity or discipline that belongs exclusively to managers.

In this research the track is closer to management of information even though the assumption is that the knowledge is embedded in people. The taxonomy should later help in understanding also the people track. From the 'Knowledge Praxis' categorization this research is close to the systematic approaches, since the target is to define systematically the content of the external knowledge.

**Classification of knowledge**

In this chapter the various classifications of knowledge are introduced and finally analyzed. The vast number classifications in the literature makes the researcher to think that one existing would do and the challenge would be just to select the best one. However the classifications themselves implicitly show to the researcher the need for a more coherent and complete taxonomy for both the practical business purposes as well as to be used in further research as described in the Introduction. The selection of the classifications presented below is that of the researcher and the aim has been to cover as large spectrum as possible to fulfill the validity and reliability criteria.

Aristotelian classification

D.G Schwartz (2006) explains how Aristotle presents the five virtues of thought that can be mapped to levels of knowledge:

1. **Epistémé:** Factual or scientific knowledge
2. **Téchné:** Skills-based technical and action-oriented knowledge
3. **Phrónesis:** Experiential self-knowledge or practical wisdom based on experience
4. **Noûs:** Intuition
5. **Sophía:** Theoretical knowledge of universal truths or first principles

According to Schwartz (2006) **epistémé** may be the most controversial element of knowledge for the Knowledge Management. It is pure knowledge, such as that of mathematics or logic. Attempting to pin down epistémé is the essence of the knowledge-information-data debate that we discussed, and chose to dismiss, earlier. As scientific knowledge, epistémé is most relevant to pursuit, and it encompasses knowledge of cause and effect, and deduction (Parry, 2003). A stated goal of information technology is to represent those facts and relationships known as epistémé in digital form, and leverage that representation in different applications as declarative knowledge. In addition, data-mining techniques seek to help identify

epistémé that is buried within an organization and bring it to the surface. In parallel, IT seeks to do the same for procedural knowledge, which maps very well to Aristotle's téchné.

According to Schwartz (2006) **téchné** deals with things that change rather than the constant relationships found in epistémé. Harnessing téchné is at once one of the most challenging and most fruitful of the Knowledge Management pursuits. To begin with, an organization is the primary place where one would find the bearer of téchné relevant to that organization, and it is precisely that knowledge that we seek to encapsulate and reuse. Téchné reflects the dynamic nature of knowledge. Furthermore, and perhaps most difficult in practice, it is the téchné that artificial intelligence and decision-support systems seek to automate. So, from that perspective, Aristotle has given us a clearly defined and delimited type of knowledge that can be addressed by information technologies.

**Phrónésis** is practical knowledge dealing with action and getting things done. In Aristotle's view, phrónésis is acquired through hands-on training and experiencing the actions being learned. From a learning-through-action perspective, phrónésis differs from téchné in terms of the way each type of knowledge can be shared. The Aristotelian view would be that téchné can be taught from practitioner to student, whereas phrónésis can only be shared through actual mutual experience. In terms of the value of knowledge, Sveiby's (1997) focus on the knowledge-action value chain can find relevant roots in phrónésis. In terms of knowledge management, phrónésis leads us in the direction of simulation, rich media, e-learning, and other forms of the experiential presentation of knowledge or immersion in a virtual environment in which the experience yielding phrónésis can be achieved.

According to Schwartz (2006) **noûs** is perhaps the least understood of all elements necessary for knowledge management. Noûs not only embodies the intuitive side of knowledge, it also subsumes a large part of what we have come to refer to as tacit knowledge (although clearly there can be tacit knowledge of téchné and phrónésis). Noûs is not restricted to knowledge of first principles, but is viewed by Aristotle as a manner in which one can become aware of first principles. Observing

the relationship between noûs and tacit knowledge, there are two fundamental approaches to dealing with tacit knowledge in knowledge management. The first approach is to attempt to externalize the tacit knowledge through interventions and representation methods in order to create explicit knowledge. This, in essence, is attempting to transform the noûs into the epistémé. The second approach is to recognize that the tacit will and should remain tacit, but that the goal of knowledge management is to enable the organization to identify and reach the owner of the tacit—the bearer of the noûs—in an efficient and effective manner. This leads to employ information technologies to support organizational communications, forums, communities, relationship networks, and the abundance of Internet-enabled interactions that have developed over the past decade. Another interpretation of noûs is that it emerges from our familiarity with phrónésis and téchné. In other words, by nurturing the support for phrónésis and téchné, one can strengthen its ability to exhibit noûs.

Schwartz (2006) argues that **sophía**, representing the universal and necessary characteristics of knowledge, has little place in understanding knowledge specific to organizational knowledge management. While universal and necessary truths are surely important to any analysis and treatment of knowledge, they are firmly in the domain of the philosophical and theoretical. Scientific discovery (which we may wish to manage post discovery), argumentation, and proof of theorems are all in the realm of the sophía, but still not within the knowledge-management mandate.

Scwartz (2006) takes the starting point to the Knowledge Management from where the knowledge can obtained:

1. Knowledge that can be acquired in an organizational setting
    a. creation
    b. discovery
    c. gathering
    d. validation
2. Knowledge that can be organized, categorized, and stored

     a.  modeling

     b.  classification

     c.  calibration

     d.  integration

3. Knowledge that can be distributed to some point of action

     a.  sharing

     b.  reuse

     c.  maintenance

     d.  dissemination

With these two dimensions a map can be drawn as described in Table 5 (Schwartz, 2006):

**Table 5** Knowledge mapping

|  | **Acquisition** | **Organization** | **Distribution** |
|---|---|---|---|
| **Epistémé** | By gathering facts and relationships known about the organizational knowledge domain and its human participants | Knowledge bases, databases, data warehouses, documents and diagrams | Enabled and enhanced by ICT |
| **Téchné** | Through interaction with practitioners who have exhibited acquired téchné | Extensive cross-referencing of skills and activities | Replicated and implemented through IT, AI and DSS |
| **Phrónésis** | By recording lessons learned and case studies in the ongoing organizational experience | Case books, project retrospective, and narratives | Stored, replicated and delivered through rich media-based IT |
| **Noûs** | By determining paths to those people who have exhibited relevant noûs within the organization by increasing support for Phrónésis and Téchné | Social networks guided by meta knowledge describing participants and their capabilities | The network is enabled by computer-mediated communications, forums and on-line communities. |
| **Sophía** | Not a goal of knowledge management | Not a goal of knowledge management | Not a goal of knowledge management |

**Source**: Schwartz (2006)

Finally Schwartz (2006) maps the different categories of knowledge with the different processes of Knowledge Management. The result of this mapping is presented in Table 6.

**Table 6** Knowledge process – category mapping

| Process | Epistémé | Téchné | Phrónésis | Noûs | Sophía |
|---|---|---|---|---|---|
| **Acquisition** | | | | | |
| creation | NO | YES | NO | NO | **N/A** |
| discovery | **YES** | **YES** | **YES** | **YES** | **N/A** |
| gathering | **NO** | **YES** | **YES** | **YES** | **N/A** |
| validation | **NO** | **YES** | **YES** | **YES** | **N/A** |
| **Organization** | | | | | |
| modeling | **YES** | **YES** | **YES** | **YES** | **N/A** |
| classification | **YES** | **YES** | **YES** | **YES** | **N/A** |
| calibration | **YES** | **YES** | **YES** | **YES** | **N/A** |
| integration | **YES** | **YES** | **YES** | **YES** | **N/A** |
| **Distribution** | | | | | |
| sharing | **YES** | **YES** | **YES** | **YES** | **N/A** |
| reuse | **NO** | **YES** | **YES** | **YES** | **N/A** |
| maintenance | **NO** | **YES** | **YES** | **YES** | **N/A** |
| dissemination | **YES** | **YES** | **YES** | **YES** | **N/A** |

**Source**: Schwartz (2006)

The PathMaster classification

The PathMasters (Savidge, 1994) are a metaphor for the key outside influencers to help companies manage directions. This goes best to the entrepreneurs but is applicable to the company as whole. The metaphor takes two words: the Path and the Master. The Path portrays all the winding, uphill and downhill trails a business faces on its journey to growth. Many have traveled these or similar paths. Having gone these or similar paths some older and more experienced people know the

right paths and can read the trail signs. This brings to the second term Master. It portrays a person who is very skilled and able in some work, profession, science, etc. This means that the definition of the PathMaster holds the requirement that the he/she must have extensive, deep, practical, broad, knowledge and experience in business. The PathMasters as defined by Savidge (1994) are the mentor, the coach, the guru and the angel.

Word one associates with **mentor** prompt memories of learning from an older person. The history of the word mentor goes back all the way to the ancient Greek (Juusela et al, 2000) where according to mythology Odysseus gave his son Thelemakhos to the hands of Athene while himself went to the war. Athene disguised herself into the form and appearance of Mentor, who was a good old friend of Odysseus. This story describes one of the basic beliefs of mankind where people learn skills, practices and values from those they value and look upwards.

It's important we look at the dynamic between older mentor and younger learner. "A good mentor is a mixture of good father and good friend. (A bad mentor, of which there are many, combines the worst features of father and friend) A 'good enough' mentor is a transitional figure who invites and welcomes a young man into the adult world. He serves as guide, teacher, and sponsor. He represents skill, knowledge, virtue, accomplishment - the superior qualities a young man hopes someday to acquire. He gives his blessing to the novice and his dream. And yet, with all this superiority he conveys the promise that in time they will be peers. The protégé has the hope that soon he will be able to join or even surpass his mentor in the work they both value." (Levinson, 1978)

Mentoring, then, is a valuable life experience for both the "young man" and the mentor. At some critical point most of the entrepreneurs probably had a mentor to help to grow. Whenever asked strong independent managing directors about their mentor, the answer is often "Never had one!". This can be expected because of their genetic code of being "loners". (Savidge, 1984).

Another mentoring observer, Baum (1992) wrote: "Protégés see their mentors as very successful, very knowledgeable, and very powerful, able to support and guide. Protégés like, admire, respect, and look up to their mentors. Protégés and mentors come to trust, take care of, and feel loyal to each other. Their relations become close, intimate, friendly, and affectionate." (Savidge, 1984).

Two evolutionary events, a maturing business and a maturing manager, are converging. The entrepreneur and the business become completely intertwined. It is difficult to separate personal and business emotions, thinking processes and time commitment. So, a Mentor helps with the two challenges of a maturing business and maturing the person. (Savidge, 1984).

If a mentor was only a teacher, one would get instructions and be shown how. If he was only a counselor, one would present the problem and he would give the answer. If he was only an elder, one would sit at his knee waiting for his wisdom and then go away to do what he said. It is hard to see business development by working with just a teacher, counselor or elder. However, working with a Mentor causes the entrepreneur to engage, challenge each other, discuss, and together consider relevant alternatives. The Mentor doesn't judge, tell, preach, orate, or do. (Savidge, 1984). Parsloe and Wray (2000) emphasize that mentoring is not about 'telling', 'directing', and 'restricting' but more 'listening', 'questioning' and 'enabling'.

Mentoring is an essential aid to staff development, but how essential, it is hard to predefine.

**The coach** is often understood as a mentor like coaching and mentoring are often treated as synonymous. But they are two different roles to help organizations learn i.e. to acquire knowledge from external sources. Coaching can be seen as an art (Parsloe and Wray, 2000) in the sense that when practiced with excellence, there is no attention on the technique but instead the coach is fully engaged with the coaches and the process of coaching becomes a 'dance' between two people moving in harmony and partnership. A less exotic definition defines coaching as a process that enables

learning and development to occur and thus performance to improve. To be successful coach requires a knowledge and understanding of the process as well as the variety of styles, skills and techniques that are appropriate to the context in which the coaching takes place.

Coaches (Savidge, 1984) want results. Their business is to teach, show, organize and motivate people to change behaviors. They have high self-esteem and confidence and accept most challenges put before them.

The Coach as a PathMaster is much easier to locate than a Mentor. Coaching is their living and they market themselves by being highly visible. They can be found in Parsloe and Wray (2000):

- Professional service firms specializing in training.
- Referrals from other managing directors
- Directories of management trainers.
- Training article authors and referenced people taken from business periodicals.

**"A Guru** has the answer, he just does not know the question!" He is an expert who has special knowledge of narrow fields within markets, process methods, technologies, applications, and human resources. (Savidge, 1984)

The real Guru's age should be above something. This depends somewhat on the context in question. Like the Coach, the Guru is a consultant who earns his living selling information as opinions. The Guru is self-confidant and usually has strong opinions or convictions about any subject of his particular field. He is not bashful and is responsive to most questions. He is a very interesting, stimulating and exciting PathMaster. (Savidge, 1984)

Toivonen (2004) uses the term specialist. The role of specialist knowledge is particularly evident in the development of producer services which many believe will

become the prime source of sustained high value-added to sectors as different as high fashion and motor-cars. In each case the producer services sector uses specialist knowledge to provide solutions which give products, even mass-produced ones, and their specific market edge.

**The Angel** is to help to raise capital, which has been, is and will be very difficult. It's frustrating, defeating and persistent work. At times the business people do not care who invested, perhaps the devil himself "Just give me the money." But there are many sides on this. From whom the company takes money is as risky for the company as it is risky for investors. (Savidge, 1984)

Business Angels appear in all shapes, forms and are of any age:

- Bankers focus on risk. They loan money according to financial rules and base decisions on quantified assets, turnover and profit. They usually have limited skill or interest to determine reasonableness of forecasts. They do not make subjective lending decisions.
- Commercial loan firms who specialize in high risk lending situations.
- Private investors place small fractions of their affluence in high risk ventures for high reward. They usually require moderate information about the business.
- Professional venture capitalists (VC's) maximize financial return by exchanging the value of cash for a proportionately greater value of company ownership. They are capable and qualified to evaluate the current and potential company worth. They exert strong influence over how the company is managed.
- Company suppliers and customers support market entry of new product or service enterprise by improving cash flow through extending credit for purchased goods, or by paying cash at time of purchase order. They usually do not invest capital or make loans.

- Family and friends invest in or loan money because of personal ties to the entrepreneur or managing director. They, like the private investor, require moderate information about the business.
- Government entities who issue grants and contracts

The Angels are active passivists investing in the company. What often happens is the following. During the capital courtship there is great activity, interaction, discussion, and selling by both angels and the company. The transaction occurs, and post-transaction activities between angels and company are like this:

- Angels expect the Board of Directors to diligently and prudently oversee and provide company direction to increase shareholder value.
- Managing directors need not report day-to-day affairs.
- The managing director convenes angels for major company events. To raise more money and "good news" celebrations to confirm the angel's wise decision to investment.
- The managing director works to complete the tasks set out in his plan, to meet timetables, and to produce sales and profits. The angel works to monitor company progress and management commitments.
- Angels expect management to be diligent, prudent, resourceful and efficient.
- Here are the enterprise risk elements all angels do or should monitor.
  - Technical
  - Markets
  - Development
  - Financial
  - People

These investors can be found all over. With these PathMasters the question is more do they want to work with the company than vice versa.

Knowledge Asset Classification

"Knowledge is more slippery than the conventional concepts of cash, production equipment, or even product reputation" (Boisot, 1998). Knowledge is in a way capacity that has been built on information extracted from data. Contrasting to information knowledge can not be observed directly. It can be said to be a set of expectations that an observer holds with respect to an event. In defining the knowledge assets Boisot (1998) takes three dimensions: codification, abstraction, and diffusion to formulate an Information Space or an I-Space. This is a conceptual framework within which the behavior of information flows can be explored and, through these, the creation and diffusion of knowledge within selected population can be understood.

Ståhle's Classification

Ståhle and Grönroos claim that every organization has three knowledge environments: mechanistic, organic and dynamic. (Ståhle and Grönroos, 2000, The Three Levels of Knowledge, 2004). On the mechanistic level, one encounters the organization's infrastructure. Information flows only in one direction, usually from the top down. Everyone knows his or her place and has access to the information needed to fulfill his or her daily tasks. This mechanistic attribute can be seen clearly in any formal organization, from a hospital's intensive care unit to a fire department.

The next level is the organic. Instead of a one-way information flow, true communication exists. An open atmosphere and unfettered dialogue enable the organization to improve its behavior and take responsibility for reaching strategic goals. (Ståhle and Grönroos, 2000)

On the mechanistic and organic levels, however, one is only operating inside the organization. One tries to take full advantage of the organizational skills and

explicit or implicit information, but the system remains closed. (Ståhle and Grönroos, 2000)

A closed system can develop itself, but the process is slow. New ideas - the seeds of innovation - emerge only occasionally. Many companies find themselves in this situation after many years of successful operations. The company has finally found a nearly optimal allocation of the traditional factors of production (labor and capital), and growth is now slowing down. Formalized brainstorming and suggestion boxes offer little help. Even experienced consultants and business advisors trying desperately to reengineer processes wind up collecting their fees without visible results. (Ståhle and Grönroos, 2000)

Experience shows that only a very few ideas lead to valuable innovations. A critical mass of ideas is needed. To accelerate the production of ideas, three components are required - skill, information and flow. Without the proper information, even a skilled individual cannot be innovative; on the other hand, without interacting with other people, without the flow, even a skilled and well-informed individual has only a very limited capacity for innovation. For innovation, a vital interaction between skilled individuals and a strong information flow are needed. Information exchange across corporate boundaries must be encouraged. Companies must be able to establish informal groups and information networks. Tacit information must be made explicit, and all employees must be rewarded for sharing useful knowledge. (Ståhle and Grönroos, 2000)

From the perspective of players on the mechanistic or organic level, this dynamic level of the organization looks chaotic, and quite rightly so. One of the central concepts of chaos theory is that while it is impossible to exactly predict the state of the system, it is generally quite possible, even easy, to mode the overall behavior of the system. A certain degree of chaos is needed to create a dynamic system in which the speed of the information flow creates a critical mass of ideas. (Ståhle and Grönroos, 2000)

It is completely clear according to Ståhle and Grönroos (2000) that every organization needs all three levels - the mechanistic, the organic and the dynamic. One cannot simply be rich in ideas without any function which transforms those ideas into innovations. On the other hand, there are certainly organizations that survive with a very limited number of new ideas and innovations. In that case, success may depend on tireless improvements on the mechanistic and organic levels.

Tacit - Explicit – Implicit classification

Knowledge can be categorized by dividing it into explicit, tacit and implicit knowledge (Nickols, 2000), explicit and implicit (Schüppel *et al*., 1998), or tacit, explicit and cultural knowledge in which tacit knowledge is personal knowledge, explicit knowledge is codified knowledge, and cultural knowledge is based on shared beliefs (Choo, 2000).

Nonaka *et al*. (1995, 1998) present the distinction between tacit and explicit knowledge based on Michael Polanyi (1966), and the definitions for them while researching the difficulties in communication of tacit knowledge. Tacit knowledge is personal, context-specific, and therefore hard to formalize and communicate. Seufert et al. (1999) further add that tacit knowledge can be conceptualized as possessing a technical and a cognitive dimension. Technical dimension contains informal, personal abilities and skills and cognitive dimension includes our mental model influenced by our beliefs, values and convictions. Explicit or "codified" knowledge is transmittable in formal and systematic language. It is articulated and, more often than not, captured in the form of text, product specifications, formulas, procedure manuals and so on (Hamel, 1991; Koskinen, 2001). Badaracco (1991) defines "easily encodable" or "decodable" knowledge being transferable and tacit knowledge being highly embedded knowledge.

The distinctions between tacit and explicit knowledge are shown in the Table 7  below. It presents features associated to tacit and explicit knowledge.

**Table 7**  Two types of knowledge

| Tacit Knowledge (subjective) | Explicit Knowledge (objective) |
| --- | --- |
| Knowledge of experience (body) | Knowledge of rationality (mind) |
| Simultaneous knowledge (here and now) | Sequential knowledge (there and then) |
| Analog knowledge (practice) | Digital knowledge (theory) |

Source:  Nonaka *et al*.(1995)

In addition to tacit and explicit knowledge, Nickols (2000) brings in the implicit knowledge that can be articulated but has not yet been done so, that is, its existence is implied by observable behavior or performance, but it has not yet been made explicit.

Tacit knowledge is considered to be a source of innovation (Nonaka, 1991, 1994) but only the combination of both tacit and explicit knowledge, within and between organizations, leads to the timely development of new products and/or services. In other words, the firms being able to combine them are knowledge-creating companies (Nonaka *et al*., 1998).

Scharmer (2000) assumes that innovations entail the enrichment of tacit knowledge such as skills and a certain view of the world. Actually, there are two forms of tacit knowledge: (1) embodied tacit knowledge, which is usually referred to as tacit knowledge, and (2) not-yet-embodied tacit knowledge, which is referred to as "self-transcending" knowledge. (Scharmer, 2000)

The term "tacit knowledge" usually denotes knowledge that is embedded and embodied in everyday practices (Nonaka *et al*., 1995). However, the second type of tacit knowledge can be thought of as not-yet-embodied, or "self-transcending" knowledge. The distinction between embodied tacit knowledge and not-yet-embodied knowledge is relevant for several reasons. First, the epistemological foundations and phenomenological experience of tacit knowledge is fundamentally different from that

of not-yet-embodied knowledge. Embodied tacit knowledge is based on action experience, whereas not-yet-embodied knowledge is based on aesthetic experience. Second, from a managerial point of view, embodied tacit knowledge needs a different kind of infrastructure from that needed by not-yet-embodied knowledge. Third, the capacity to tap into the sources of not-yet-embodied knowledge (like customers' imaginations) is the only sustainable source for competitive advantage in an age of hyper competition. An example of embodied tacit knowledge is the act or process of baking bread (Nonaka *et al.,* 1995). An example of not-yet-embodied tacit knowledge is the invention of baking bread in the first place. (Scharmer, 2000)

In addition to two types of tacit knowledge also explicit knowledge is presented in Table 8, which shows the three forms of knowledge and their differences from epistemological point of view.

**Table 8**  Three epistemologies

| | **Explicit knowledge** | **Embodied tacit knowledge** | **Self-transcending knowledge** |
|---|---|---|---|
| Form of knowledge | Knowledge about things | Knowledge about doing things | Knowledge about originating sources for doing things |
| Data | External reality | Enacted reality | Not-yet-enacted reality |
| Experience type | Observation experience | Action experience | Aesthetic experience |
| Action-reflection ratio | Reflection without action | Reflection on action | Reflection in action |
| Truth | Matching reality | Producing reality | Presenting reality |
| How do you know that you know | Can you observe it? | Can you do it? | Can you tap into the field of its emergence? |
| Perspective | External: view on objective reality | Internal: view on enacted reality | Both internal and external: view on not-yet-enacted reality |
| Subject-object relationship | Separation | Unity (after action) | Unity (in action) |

**Source**: Scharmer (2000)

According to Scharmer (2000), companies operate, consciously or not, on 12 types of knowledge. Nonaka *et al*. (1995) determine a framework based on two distinctions: one ontological (individual – group - organization - inter-organization) and one epistemological (tacit – explicit). In the Scharmer's model, the epistemological distinction differentiates between three forms of knowledge: explicit knowledge, tacit knowledge and self-transcending knowledge. The ontological differentiates among four levels of corporate action: delivering results that create

value (performing), improving the process-based context of performing (strategizing), re-framing the assumption-based context of performing (mental modeling) and reconceiving the identity-based context of performing (sculpturing). Table 9 describes the relations between the differentiations.

**Table 9**  Twelve types of knowledge in organizations

| Epistemological/ action type | Explicit knowledge | Tacit knowledge | Self-transcending knowledge |
|---|---|---|---|
| Performing | Know-what | Knowledge-in-use | Reflection-in-action |
| Strategizing | Know-how | Theory-in-use | Imagination-in-action |
| Mental modeling | Know-why | Metaphysics-in-use | Inspiration-in-action |
| Sculpturing | Know-for | Ethics/aesthetics-in-use | Intuition-in-action |

Source: Scharmer (2000)

Based on the Table 9 and the three columns in it, the historical development of Knowledge Management can be presented as a play that is enacted on three stages. The first stage is knowledge about things. Knowledge is nothing but information. This is still dominant in many institutions. An example of this knowledge can be a balance sheet (know-what), accounting rules (know-how), a report based on activity-based costing (know-why), and the mission statement of a company (know-for). In all these examples, knowledge is disclosed in the same structure: it is presented as a piece of information that is separate from the practice or reality it denotes. (Scharmer, 2000)

The second historical stage covers the first and the second column. Knowledge is not a thing but a process. The stage is based on the interplay between explicit knowledge and tacit-embodied knowledge. This stage is largely based on the work of Nonaka (1991, 1994) and Nonaka *et al*. (1995). In their theory of knowledge creating

company, Nonaka and Takeuchi present a view of knowledge creation that takes into account both explicit and tacit knowledge. Knowledge develops as cycles between explicit and tacit forms of knowledge in evolving "knowledge spiral" which is examined more in the following sections.

According to Scharmer (2000), Nonaka's *et al.* (1995) theory has left a question open: What is the driving force that moves the knowledge spiral? On the third historical stage, knowledge is situated in an incipient, not-yet-enacted reality, which is brought into existence through an act of action-intuition or self-presencing. The terms "action-intuition" and "self-presencing" signify a state of mind in which the distinctions between inside and outside, and knowledge and action become blurred and meaningless. Hence, the third stage is based on the interactions between three stages, on which the explicit, the tacit-embodied, and the not-yet-embodied forms of knowledge are being enacted simultaneously. (Scharmer, 2000)

Managing the stage one (explicit knowledge) is commonly known by companies. Less knowledge about how to manage stage two (tacit embodied) and the least knowledge about how to manage stage three forms of knowing (self-transcending) is spread among companies (Scharmer, 2000). Maybe the term managing is not quite right when stages two and three are concerned. We can manage data banks but we cannot manage human experience.

The Bi-polar classification

Schüppel et al. (1998) present four bipolar dimensions for forming a knowledge management as shown in Table 10.

**Table 10** Bipolarity of knowledge

| internal knowledge | external knowledge |
|---|---|
| actual knowledge | future knowledge |
| explicit knowledge | implicit knowledge |
| knowledge from experience | knowledge from rationality |

Source: Schüppel *et al*. (1998)

Here the external knowledge has been explicitly defined as the opposing power to the internal knowledge. Schüppel *et al*. (1998) offer numerous instruments in every bipolar dimension which can "kick off" the earlier described knowledge spiral.

Lippit's Classification

Lippitt (1973) has made a classification of external experts or knowledge over 30 years ago, much before the Knowledge Management movement started, where the work of a consultant has been described as:

- Advocate
- Expert
- Trainer
- Alternative Identifier
- Collaborator
- Process Specialist
- Fact-Finder
- Reflector.

The **Advocate** persuades client as to a proper approach. In some circumstances the client system or organization may be attempting to solve a problem or effect a change by suing a method or a medium which the change agent, in this case the advocate, from his professional experience, feels will not work. The change specialist, i.e. the advocate, may need to use the best of his persuasive skills,

especially if the time is short, to persuade the client not to use that practical approach. There might be a time to be emphatically an advocate. Lippitt (1973) This describes only a little of the knowledge the external expert has, but more about the approach or the attitude this external expert should be using.

The **Expert** gives expert advice to client system. There will be numerous occasions when the client will expect the change specialist to answer a technical question; e.g., the value of a certain kind of development process. Lippitt (1973)

**Trainer** of the client system is a situation where one can find that the change agent will provide a learning experience for the client system on a one-to-one basis, a group basis, or perhaps an organization renewal program. This is where the consultant becomes an educator. In the larger context, the consultant is to some extent always educating in a variety of his functions, but in this particular context he is the planner of an educational experience that has built into it precise learning goals and objectives. Lippitt (1973)

**Alternative Identifier** provides alternatives to client system. In these circumstances we find that the change agent may offer alternative solutions to a problem. Such a situation is not one in which the consultant is the implementer of a solution, but one where he recognizes the values of identifying alternative ways to confront the change situation. Lippitt (1973)

**Collaborator** in problem-solving is connected to situations where the client system and the consultant are working together as a pair, as a group, or as members of an organization or a community. There are times when the change agent becomes a full-fledged participant of the change situation. This is seen by some behavioral scientists as tending to destroy the consultant- client system relationship, but in many situations this kind of joint membership is a valid and valuable role in initiating and implementing change. Lippitt (1973)

**Process specialist** assists in problem-solving process. In this situation the change agent serves in his consultant role as a "process observer." He does not get involved in the "content" of the problem, which may be outside his area of competence. Rather, he helps the client system maintain the quality of its problem-solving processes through his skill as a change specialist. Lippitt (1973)

**Fact-Finder** is one of the key roles of a change agent is to be a fact finder, and this may include data collection about the client's system through interviewing, questionnaires, surveys, or observations. In other cases, it may be helping a client's system collect data for itself. This might be assisting the client's system, among other things, in how to observe, how to develop questionnaires, or how to interview. Lippitt (1973)

**Reflector** serves as catalyst to the client system. In this category, the change agent might only ask questions for the client system to take into account as it considers a certain change effort. Does this kind of professional change agent need to have specific qualifications? Must he be an applied behavioral scientist? Does he need to be an expert on communication, or on systems? Does he has to be so courageous or personally active in initiating change, perhaps at his own risk, that unusual psychological maturity is required? The answer to each of these questions is obviously 'yes'. Whenever responsible for initiating change, the change agent will need to manifest professional behavior and leadership. Lippitt (1973)

Arbnor and Bjerke's Classification

Arbnor and Bjerke (1996) represent six categories of knowledge, which they also call social science paradigms. Their classification is summarized in the Table 11 below:

**Table 11** Social science paradigms

| | Ultimate reality presumptions | Stipulations about human nature | Ambitions for creating knowledge | Some common metaphors, pictures and description | Some techniques for creating knowledge |
|---|---|---|---|---|---|
| 1 | Reality as a concrete and conformable to law from a structure independent of the observer | Man as stimulus – receiver and responder | To reconstruct external reality – the empirically general one | Machine; mathematics; logic | Surveys; operational definitions |
| 2 | Reality as a concrete determining process | Man as social fact | To explain entities in their regularities and breaks | Organism; 'natural selection' | Historical analysis |
| 3 | Reality as a mutually dependent fields of information | Man as information transformer | To reconstruct contexts in terms of information | Cybernetics; network of information | Contextual analysis |
| 4 | Reality as a world of symbolic discourse | Man as a role-player and symbol-user | To understand patterns of social interactions in terms of symbolic discourse | Role-playing; theater; culture | Symbolic analysis |
| 5 | Reality as a social construction | Man as active creator of symbols | To understand how social reality is constructed, maintained and defined | Language games; typifications; network of meanings | Hermeneutic diagnosis |
| 6 | Reality as a manifestation of human intentionality | Man as intentional conscience | To develop eidetic insight instead of an empirical one | Intentionally; transcendence | Variations of free imagination; to bracket appearances |

**Source**: Arbnor and Bjerke (1996)

From the table can be seen, that the classification is about paradigms and about knowledge creation and not about knowledge itself. However the application of the classification by Arbnor and Bjerke (1996) to the business perspectives can be utilized as described in Table 12.

**Table 12** Arbnor and Bjerke's perspectives

| | Perspective | What is an entrepreneur? | How are new businesses created | How can the business development process be improved |
|---|---|---|---|---|
| 1 | Reality as a concrete and conformable to law from a structure independent of the observer | A person who reacts rationally to certain objective external conditions and creates something new | By providing suitable objective external conditions for persons who react rationally to them | By introducing as many as possible of those stimuli that best explain the effects of the business development structure on rationally reacting person |
| 2 | Reality as a concrete determining process | A person who fits in as a component in a business developing system, directed by goal | By functioning business developing system, directed by goal | By adapting entrepreneur and/or the business developing system better to each other |
| 3 | Reality as a mutually dependent fields of information | A person with superior information about customer needs and the resources of the company | By information systems | Based on the principle of negative feedback, reacting to new information |

**Table 12** (Continued)

| | Perspective | What is an entrepreneur? | How are new businesses created | How can the business development process be improved |
|---|---|---|---|---|
| 4 | Reality as a world of symbolic discourse | A person who sees progress and change as dominating part of his or her symbolic world | By culture that contains new business as symbols of exciting developments | By influencing the culture for development through suitable symbols for creating new business ventures and renewing old ones |
| 5 | Reality as a social construction | A person who sees the process of creation as dominating part of his or her everyday reality | By business development being a natural part of the construction of the social reality | Activate and renew the language games about and the actions in the business of venturing |
| 6 | Reality as a manifestation of human intentionality | A person who sees his or her existence as a result of own expectations and as possible as contained in what is 'factual' | By person with 'eidetic intuition' about business development | By liberating and visualizing the imaginative power of people and trusting their inherent creative capability. |

Johnson – Lorenz – Lundvall  classification

According to Johnson, Lorenz and Lundvall (2002) knowledge is built of four categories:

1. know  what
2. know  why
3. know how and
4. Know who.

”**Know what**” is explicit facts about organizations which can be learned at schools or from books and other sources of information. Good examples of this type of knowledge are the values of turnover and market share.

“**Know why**” is mainly explicit knowledge or information. These are typically various principles, laws and rules either in the minds of people or shared in the society. “Know why”  is also connected to technological and scientific knowledge also in the business life. This is the knowledge that can be understood to be behind the business logic and operations. Company R&D utilizes typically this “know why”.

”**Know how**” is the individual's capability to do something. It is tacit knowledge by nature and it is based on the learning through experiences at individual level. “Know how” is related to how skills and various routines are used in business operations.  Examples of the utilization of this “know how” are how prospects of new products are seen by the management or how people are recruited.

”**Know who**” is tacit knowledge and it means the people network where the organization operates.  Members of the network include own personnel and other stakeholders.  This knowledge is depended much on the skills of collaboration and communication.

When these knowledge types are put on the organizational level they would present shared database, shared models of interpretation, shared routines and shared relationship network.

Summary

This research originally started from the ideas and the classification of Savidge (1994). By analyzing the classifications presented earlier we can come to the following (Table 13) conclusion comparing the some the other classifications to that of Savidge's PathMaster classification.

**Table 13** Comparing classifications

|  | **Mentor** | **Coach** | **Guru** | **Angel** |
|---|---|---|---|---|
| Aristotelian | Phrónésis<br>Noûs | Téchné | Epistémé<br>Sophía | Epistémé<br>Sophía |
| Explicit – tacit<br>– implicit | Mostly tacit | Mostly explicit<br>but some tacit | Mostly explicit | Mostly explicit |
| Lippit | Advocate<br>Expert<br>Collaborator<br>Reflector | Trainer<br>Alternative<br>identifier<br>Collaborator<br>Process<br>specialist<br>Reflector | Collaborator<br>Fact finder | Collaborator |
| Johnson –<br>Lorenz –<br>Lundvall | know why<br>know how<br>know who | know what<br>know how<br>know how | know what | know what<br>know who |

**Knowledge transfer**

Transfer calls for the movement of knowledge from one location to another. There are three types of knowledge transfer (Awazu 2004) :

- transfer across individuals,
- transfer across units and
- transfer over time.

Transferring knowledge across time periods is particularly important since it enhances knowledge exploitation by utilizing past experiences for current problem solving. If an organization has optimal transfer facilities for knowledge, it avoids the need to store similar knowledge in multiple places. Awazu (2004) further claims that aggregation and transfer of knowledge is useless unless sense making occurs.

According to Nonaka *et al* (1995, 1998) the knowledge creating process is a dynamic spiral that moves from the individual to organization and inter-organization dimensions. This Socialization – Externalization – Combination - Internalization (SECI) spiral (Figure 7) is composed of four sequences. Socialization (tacit to tacit) is the sequence where knowledge is transmitted through observation, imitation and practice from one individual to another.
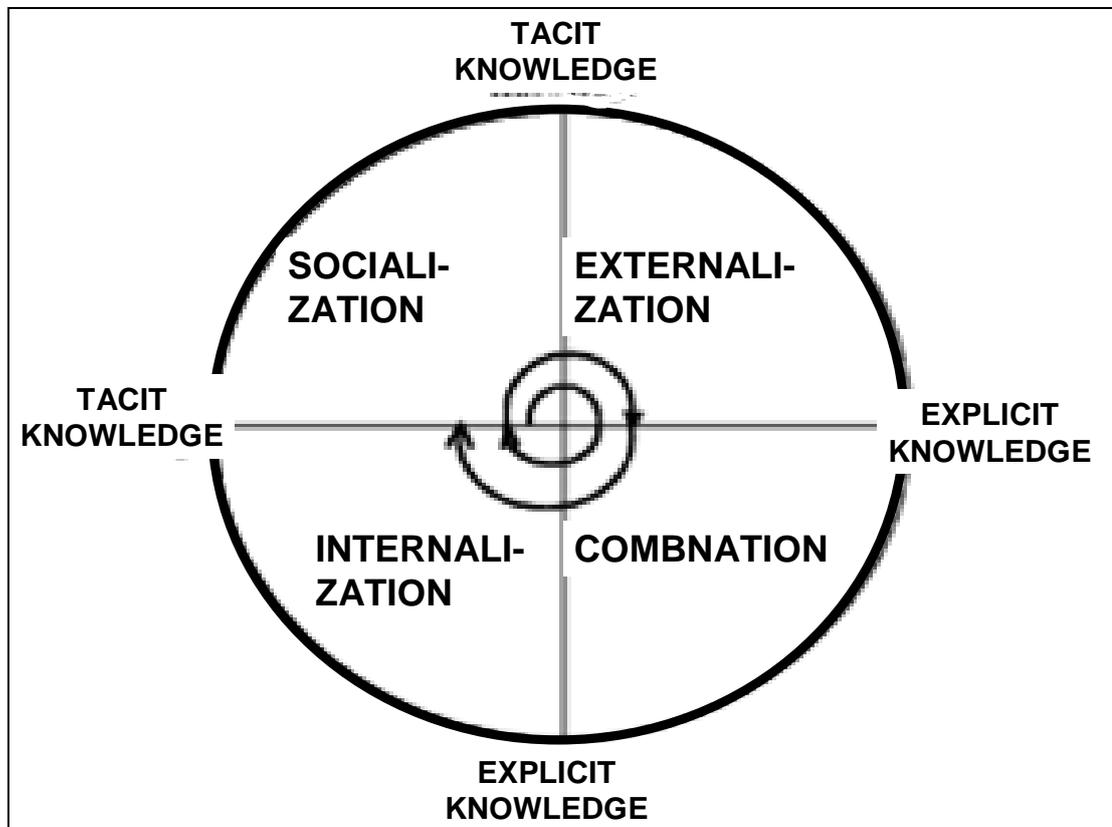
**Figure 7**  The SECI spiral
**Source**: Nonaka and Takeuchi (1995)

Knowledge transfer involves conveying and diffusing knowledge throughout an organization to leverage the ways it can be used to solve problems and strengthen performance. Effective knowledge transfer manifests itself through increasing the value of a firm's knowledge assets, which should eventually be reflected in better organizational performance. Furthermore, the transfer and integration of knowledge across different contexts can generate new insights, as application in other contexts increases the scope and value of knowledge. Critical to successful knowledge transfer is the learning capacity of the recipient organization. (Kess *et al*., 2007)

Barson *et al.* (2000) has listed several elements that create and maintain barriers in knowledge transfer that are described briefly in the following chapters.

**Costs of managing knowledge transfer.** A barrier to inter-organizational knowledge management is the cost of managing collaboration. Barson *et al*. (2000) refers to studies of Farr and Fischer (1992) and Tabrizi and Walleigh (1997) studies of product development projects involving an international co-operative approach. They identify increased costs due to cooperation with incapable suppliers and organizational co-ordination costs. They also identify differences in styles, priorities and motivation as factors resulting in cost increases.

**Protection of proprietary knowledge**. Sharing proprietary information with collaborators leaves an organization open to the risk that this information will be revealed, either intentionally or unintentionally, to competitors. (Barson *et al*., 2000)

**Distance.** In order to transfer and share knowledge, and open means of communication is required. Nonaka (1991) identified face-to-face communication as the most efficient means, but the geographical location of the organizations may mean that this is not possible. Geographical separation may also result in the companies working in different cultural, legislative or linguistic environments. (Barson *et al*., 2000)

**Internal resistance** can take a number of forms. Firstly, there is the desire to protect the interests of the company, by restricting the knowledge being transferred to outside sources. Second, manufacturers may be dismissive of the importance of their links with, often smaller, suppliers. Third, where links do occur that are often narrow in their scope, focusing on technical knowledge transfer and maintained by an individual or small group. The internal resistance can also be found it the more common problems or challenges of any company i.e.: the lack of active participation of top and middle management, the adoption of a domineering and controlling attitude towards the smaller company, and insufficient communication interface design. These are supported in the case of knowledge transfer by the study of Doz (1988) (Barson *et al.*, 2000)

**Self interest**. It is unusual for a company to supply a single customer and where a firm has more than one customer it is likely that they are competitors. The customer may therefore be unwilling to share knowledge with a supplier, since information may filter through the competitors and any improvement in the capabilities of the supplier will benefit the competitor as well as the sharing company. (Barson *et al*., 2000)

**Lack of trust.** Trust concerns both the receipt and the dissemination of knowledge. If an individual does not trust the information or knowledge they are receiving they are obviously unlikely to make full use of it. Conversely, if an individual does not trust the person to whom they are imparting knowledge to use it wisely or keep company secrets they will resist sharing. "Trust, it is argued, provide the conditions for collaboration and for the sharing of knowledge and is thus indispensable to the use of KM systems" (Barson *et al*., 2000, Lucas, 2000, Scarborough *et al*., 1999)

**Risk** is related to both the trust and proprietary knowledge barriers. Inter-organizational knowledge sharing inherently involves an element of risk, particularly where proprietary knowledge is being shared. The companies and individuals involved must therefore trust each other to use the knowledge in an appropriate manner. (Barson *et al*., 2000)

**Fear of exploitation**. Lucas (2000) identifies one reason restricting the transfer as the fear of exploitation "starts with the premise that I will only share my knowledge with you if I think you can give me something in return." (Barson *et al*., 2000)

**Fear of contamination**. Lucas (2000) argues that "people from firms with a very up-market brand image were nervous about getting together with people they perceived as more down-market." (Barson *et al*., 2000)

Valence (2006) argues that knowledge transfer can happen haphazardly or intentionally. People and companies that desire to create a culture of knowledge transfer and sharing can employ three progressive methods of knowledge transfer:

- training,
- coaching, and
- mentoring.

Each method accommodates the needs and expertise of different professionals to facilitate a greater level of mastery for all. This can be extended a bit further since knowledge can be transferred in many various ways like:

- in person
  - with physical presence
    - casual conversations
    - meetings
    - brainstorming sessions
  - from a distance
    - conference calls
    - voice mails
- training
- documents
  - memos
  - reports
  - training materials
- internet/intranet
  - e-mails
  - web-sites
- groupware
- databases
- knowledge bases

Knowledge transfer is essential question in the context of management of external knowledge. However the form of the transfer should have strong if any influence on the classification of the knowledge or the taxonomy.

**Learning organizations**

The utilization of knowledge in general and external knowledge especially can be seen on one hand as an activity of individuals and on the other hand as organizational activity. The research question of thus study has the focus on the organizational aspect: what type of external knowledge an SME can utilize in order to improve the performance.

One theory, where the external knowledge plays a crucial role is the theory of learning organizations. There have been many attempts to define a learning organization, and as Virkkunen and Kuutti (2000) point out, the theory of learning organization is fragmented. The most well known definition is that of Senge (1994): "Organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to learn together." In addition, Senge lists "five disciplines" that are the keys to achieving this type of organization: personal mastery, mental models, shared vision, team learning, and most importantly, systems thinking.

Employees' individual learning is of course important, but it does not necessarily improve performance of the organization they work in. If organization itself does not learn, that is, integrate new knowledge learned by its members and change its ways of action accordingly, individuals working within the organization may not be able to exploit the lessons they have learned. Organizations that are able to learn faster will be able to adapt quicker and thereby achieve significant strategic advantages. These organizations are called a learning organization, and they possess the capability to (Marquardt, 2002):

- Anticipate and adapt more readily to environmental impacts

- Accelerate the development of new products, processes, and services

- Become more proficient at learning from competitors and collaborators

- Expedite the transfer of knowledge from one part of the organization to another

- Learn more effectively from its mistakes

- Make greater organizational use of employees at all levels of the organization

- Shorten the time required to implement strategic changes

- Stimulate continuous improvement in all areas of the organization.

Adoption of the learning organization paradigm requires organizations to rethink their basic ideas. While the need to acquire more knowledge will continue, but what people and organizations know takes second place to what and how quickly they can learn. Learning skills will be much more important than data. A learning organization has the capacity to collect, store, and transfer knowledge and thereby continuously transform itself for success. (Kasvi, 2003)

**Table 14** The seven key paradigm shifts that make a learning organization different from the traditional organization

| Traditional focus | Learning organization focus |
| --- | --- |
| Productivity | Quality of performance |
| Workplace | Learning environment |
| Predictability | Systems and patterns |
| Training | Learning |
| Worker | Continuous learner |
| Supervisor/manager | Coach and learner |
| Engagement/activity | Learning opportunity |

**Source**: Kasvi (2003)

Organizational learning takes place when new routines and ways of action are conceived and adopted in an organization through individual learning and group dialogue. These routines and ways of action are not dependent on the individuals and groups that have created them but survive even after the people involved have left the organization. Learning in organizations can occur at three levels. (Kasvi, 2003)

**Individual learning** is needed since individuals form the units of groups and organizations. The factors that can contribute to individual learning in the organization include:

- Individual and collective accountability for learning
- Locus and focus of individual learning (learning should have immediate
- application to the job.)
- Accelerated learning techniques.
- Personal development plan (people recognize that employers cannot guarantee them lifelong employment but that they can assist them in achieving lifelong employability. There should be a partnership between the organization and the employee to assist in the long-term career development.)
- Abundant opportunities available for professional development

- Individual learning linked to organizational learning in an explicit and structured way.

**Group/team learning** means that work teams must be able to think and create and learn as an entity. They must learn how to better create and capture learning (learning to learn). A successful team learning system ensures that teams share their experiences with other groups in the organization. Team learning will occur more fully if teams are rewarded for the learning they contribute to the organization. Marquardt uses Watkins and Marsick's team learning model that shows the learning organization as the union of individuals and organization. The key is the overlap, which is where teams function. (Kasvi, 2003)

**Organizational learning** (1) occur through the shared insights, knowledge, and mental models of members of the organization, and (2) builds on past knowledge and experience which depends on institutional mechanisms (policies, strategies, explicit models...) used to retain knowledge. Though organizations learn through individuals and groups, the process of learning is influenced by a much broader set of variables (for example, the performance of a symphony is more than the sum of individuals' knowledge and skills but the result of the know-how embedded in the whole orchestra working in unison). (Kasvi, 2003)

Another, problem focused perspective to organizational learning is offered by Argyris and Schön (1978), who identify three different levels of organizational learning.

- In **single loop learning** an organization learns when it observes an error and corrects its, but does not change its policies, objectives or thinking models.
- In **double loop learning** an organization learns by correcting observed errors in a way that involves the modification of organizational norms, policies and objectives.
- In **deutero learning**, members of an organization reflect on and inquire into organization's previous contexts and experiences for learning. Based on these

reflections, the organization and its members learn to learn, understand what facilitates or inhibits learning and invent new approaches for leaning.

Raybould (1995, 2000) proposes an Organizational Performance/Learning Cycle as a basis for a conceptual framework for thinking about how people learn and perform in an organization. This Cycle has five phases:

1. During **Performance-centered design** a knowledge base is structured and an interface created to present the knowledge to users.
2. **Performance** is achieved through the use of the system.
3. **Individual Learning** (of existing knowledge) happens as a result of performance supported with the system.
4. **Generation of new knowledge** happens in the course of performing work when the user develops new techniques, methods and procedures.
5. **Knowledge Capture** of the additional knowledge gained by individuals and teams in the course of performing their work is essential for organizational
6. learning.

Organizational learning takes place when this loop is completed, and the knowledge captured in phase five is integrated into the knowledge base structured in phase one.

**Knowledge Intensive Business Services**

Since the mid-1990s, business services based on expertise have been referred to with the term "knowledge-intensive business services (KIBS)". The term "intensive" in this context emphasizes that the knowledge functions concerned involve more than mere transfer of existing information (Miles *et al.*, 1995).

The core of the activities of KIBS has been seen to be just that kind of fostering of knowledge development through learning, which according to current understanding is essential in innovation activities. On this basis a number of studies

have been carried out on the innovation activities of KIBS. These studies have dealt with KIBS both as sources, carriers and facilitators of innovation. Especially those sub-sectors of KIBS that are connected with technological development have been found to be very innovative. All kinds of KIBS have been perceived to function as carriers and facilitators of innovations. While "shuttling" between various firms, KIBS provide their clients consultative services based on the knowledge and experience gained from other clients. (Howells, 2000, Miles, 1999a, Toivonen, 2004).

**Resource-based view of the firm**

Wernerfelt (1984) began to look at firms in terms of their resources rather than in terms of their products. Resourced-based theory explains firm as bundles of resources, which consist of all assets, capabilities, knowledge, organizational structure, procedures, and so forth that are possessed and controlled by the firm (Wernerfelt, 1984, Tsang, 1998a). Grant (1996) argued that the resource-based view of the firm is less a theory of firm structure and behavior as an attempt to explain and predict why some firms are able to establish positions of sustainable competitive advantage and, in doing so, earn superior returns. The resource-based view perceives the firms as a unique bundle of idiosyncratic resources and capabilities where the primary task of management is to maximize value through the optimal deployment of existing resources and capabilities, while developing the firm's resource base for the future. There are different ways of classifying these numerous firm resources. Barney (1991) believed the resources are grouped into three categories, namely physical resources, human resources and organizational resources. Physical resources include tangible assets such as land, plant, equipment, finished and semi-finished goods, as well as intangible assets such as brand name, copyright and patent. Human resources include the education, training, experience, relationships, skills, and intelligence of individual staff in a firm. Finally, organizational resources include corporate culture, organizational culture, organizational structure, rules, procedures, management information systems, as well as a firm's relationships with external institutions. The resource-based view of the firm suggests that organizations can derive sustainable

competitive advantage by acquiring and structuring their resources and relations in a manner that is both long-lasting and inimitable. Resource heterogeneity can be a source of sustainable competitive advantage, if resources and their related activity systems have complementarities (Eisenhardt and Martin, 2000). From this perspective alliance arise when a firm needs additional resources that cannot be purchased via market transaction and cannot be built internally with acceptable cost and risk, or within an acceptable amount of time (Eisenhardt and Schoonhoven, 1996, Wang, 2007).

A typical study utilized the resource-based theory on alliances is the Das and Teng's (2000) research. The researchers systematically applied the resource-based view to strategic alliances to analyze various aspects of strategic alliances which are the rationale, formation, structure and performance of alliances with resource characteristics as influencing factors. The researchers believed the inducement of alliance formation is influenced by the mobility, imitability, and substitutability of resources. They also clarified the alliance structure is selected on the basis of whether resources are property-based or knowledge-based. Das and Teng further analyzed the relationship between alliance performance and inter-partner resource alignments. Resource alignments between partners are classified as supplementary, complementary, surplus and wasteful alignments. The researchers proposed that alliance performance is positively related to supplementary, complementary, surplus and wasteful alignments respectively. This research showed that resource-based view can be applied to the study on the whole process of partnership development by exploring how the partners organize and manage the resources they provided. (Wang, 2007)

There are several studies which compare the resource-based theory and the transaction cost theory to explain strategic alliances. Yasuda (2005) compared the two theories in their suitability to explain firms' formation of strategic alliances under high-technology business environments. His empirical analysis recognized that primary motivation of strategic alliances is the access to resources, followed by the shortening of time required for development or marketing. The research reached the

conclusion that the resource-based theory prevails over the transaction cost theory to explain alliance activities in high-technology industries. Das and Teng (2000) identified the rationale for entering into alliance based on the two theories. Based on the resource-based theory, the alliance rationale is value maximization of firms through pooling and utilizing valuable resources. Firms consider strategic alliances as strategies used to access other firms' resources, for the purpose of garnering otherwise unavailable competitive advantages. On the other hand, firms' ownership decision concentrates on minimizing the sum of transaction costs and production costs based on the transaction cost theory. Alliance will be preferred when the transaction cost associated with an exchange are intermediate and not high enough to justify vertical integration. Tsang (1998) argued the motivation and instability of alliances by comparing the two theories. According to the resource-based theory, firms maximize profits through using and developing their resources. Based on this theory, the fundamental motivation is to maximize the long run profit and the inherent source of instability is the imitation of resources by partners. On the other hand, the transaction-cost theory assumes that fundamental motivation of alliances is to economize transaction cost and inherent source of their instability is the opportunistic behavior of partners. Chen and Chen (2003) compare the two theories for the selection of governance structure of strategic alliances. They separate governance structure into EJV (equity joint ventures) and contractual alliances, and contractual alliances are further delineated into integration alliances and exchange alliances. Empirical analysis clarifies that the transaction-cost theory is more relevant in choosing between EJV and contractual alliances, whereas choice between exchange and integration alliances is based on resource profile of the partners. (Wang, 2007)

Human resources

Human Resources are of paramount importance to any organization. In fact, most managers and entrepreneurs agree that skilled, experienced, and loyal employees represent the biggest asset and provide security for successful organizational performance.

Human resources have at least two meanings depending on context. The original usage derives from political economy and economics, where it was traditionally called labor, one of three factors of production. The more common usage within corporations and businesses refers to the individuals within the firm, and to the portion of the firm's organization that deals with all personnel issues. (Wikipedia, 2007)

Human Resource Management includes all activities used to attract and retain employees and to ensure they perform at a high level in meeting organizational goals. These activities are made up of (Jones *et al.*, 2002, Kess, 2007):

1. Recruitment and selection
2. Training and development
3. Performance appraisal and feedback
4. Pay and benefits
5. Labor relations.
6. Firing.

Business owners and managers need to understand the fundamental principles of human resources management and acquire the necessary skills to conduct an efficient operation. (Business, 2010, 2007)

Physical resources

Physical Resources of an organization include manufacturing equipment and tools, inventories, production, assembly, storage, and distribution facilities. These resources are of particular importance to a manufacturing organization and usually require a substantial investment of capital. Acquisition, maintenance, and development of physical resources represent an integral part of production and operational activities. Business owners and managers, therefore, need to be familiar with the underlying principles of production and operations management to ensure efficient organizational performance.

Financial resources

Financial Resources are required by all organizations to provide for continuous operations and to fund growth. The prime sources of capital utilized by organizations include their own retained earnings, equity capital provided by shareholders, and debt capital provided by banks and other financial institutions. Availability of sufficient capital is of prime importance since it enables the organization to offer more favorable payment terms to its customers and to obtain maximum discounts from suppliers. In addition, sufficient capital enables the organization to offer competitive salaries, wages, and fringe benefits, thereby attracting a higher caliber of employees. Furthermore, sufficient capital enables the organization to purchase modern equipment, thus ensuring higher operational efficiency and productivity. Business owners and managers, therefore, need to understand the basic principles of financial management to ensure a profitable long-term organizational performance. (Business 2010, 2007)

Information resources

Information Resources include, but are not limited to, on-line and batch administrative and academic systems and applications, application software, operating system software, operating support software, security software, data files and databases, mainframe, mini, micro or personal computers, printers, data storage devices and media, video monitors, communications controllers, monitoring equipment, modems, transmission media of all types, gateways, networks (local area, backbone, wide area, etc.) and networks used to communicate to other state, national, and international computerized resources. (Glossary, 2007)

Knowledge resources

A distinct but strongly related body of literature focuses on knowledge as the most important strategic resource of the firm, and the implications of this for the firm's existence, its size and scope, and its ability to generate competitive advantage

(Conner and Prahalad, 1996; Grant, 1996; Kogut and Zander, 1992, 1993; Spender and Grant, 1996). The knowledge-based view of the firm can not as yet be viewed as a theory of the firm but it has attracted a great deal of interest in recent years, and to some degree has supplanted the resource based view as a focus for research. As Conner and Prahalad (1996) claim, "a knowledge based view is the essence of the resource based perspective…privately held knowledge is a basic source of advantage in competition". Despite the broad acceptance of the notion that knowledge is central to a firm's competitiveness, there is still a great deal of discussion about the nature of knowledge, and the way that it manifests itself within the firm. A useful starting point is to focus on the firm's *knowledge assets* as the "building blocks" of the firm (Amit and Schoemaker, 1993, Birkinshaw and Fey, 2001, Oiva, 2007)

Knowledge-based view explains firms as heterogeneous knowledge-bearing entities, which is a complement perspective to the pure contractual interpretation on the nature of the firm (Foss, 1996). Firm is not only as efficient contractual entity, but just as much its function as a repository of distinct productive (technological and organizational) knowledge, and as an entity that can learn—and grow—on the basis of this knowledge (Dosi *et al.*, 1992). Firm plays the role that it permits individuals to specialize in developing specialized expertise, while establishing mechanisms through which individuals coordinate to integrate their different knowledge bases in the transformation of inputs into outputs (Grant, 1997). Therefore, by resorting to cooperation with other firms, a firm is able to both better utilize its internal knowledge resources and access the knowledge resources of outside firms. As the knowledge boundaries of individual industries become increasingly fluid, such inter-firm collaboration also avoids the long time lags in developing new capabilities internally, and allows firms "strategic options" on new technologies in the face of uncertainty over future knowledge requirements (Grant, 1997). Thus, alliances provide the best context for creating value by exchanging or combining dispersed knowledge. Firms that face high environmental uncertainty especially can utilize alliances to enhance and speed organizational learning, reshape their environment and reduce strategic uncertainty (Hoffmann and Schlosser, 2001). Therefore, there is an

incentive to study the partners in partnerships achieving good performance through knowledge management.

Knowledge assets include such intangible resources as reputation, a customer database, a new technology, or a consulting company's service offering. Knowledge assets can in principle be traded, and would not therefore be expected to form the basis of a firm's competitive advantage except in combination with certain higher-order capabilities. However, the reality is that the market for knowledge assets is far from perfect, and the ability of the firm to appropriate value from them depends on several factors. (Birkinshaw, 2001) One primary factor is the ease of competitive imitation. Some knowledge assets are highly context specific, tacit in nature, and hard to value, which makes it difficult for competitors to identify and internalize them; others are relatively transparent and easily codified, and therefore highly prone to competitive imitation (Arrow, 1971, 1984, Grant, 1996, Kogut and Zander, 1992, 1993, Winter, 1987). The second important factor is the extent to which intellectual property rights can be established around them, with patents and trademarks as the obvious examples of knowledge assets that are well-protected. Taken together, these factors determine the "appropriability regime" for the knowledge assets in question (Teece and Pisano, 1994), or in other words the likelihood that the firm will be able to appropriate value from them.

The permeability of the firm boundary is dependent to a large degree on the type of knowledge in question. Some knowledge, as noted above, is relatively more codified, observable, and system-independent, which all else being equal allows it move more freely across firm boundaries as well as within the firm (Kogut and Zander, 1992, 1993, Winter, 1987). But permeability is also dependent on the nature of the relationships that the firm has with external actors. Every firm has ongoing exchange relationships with customers, suppliers, and many other actors in its task environment, and the way that these relationships are structured will have a considerable impact on the ease with which knowledge flows into and out of the firm. In other words the permeability of the firm boundary is as much a matter of strategic choice -in the way that external relationships are structured- as it is a function of the

nature of the firm's knowledge assets. And these choices, consequently, have implications for the ability of the firm to generate competitive advantage from its knowledge assets. This line of thinking becomes particularly salient as we move into an analysis of the different approaches firms can use to source external knowledge, because each approach has very different implications for the flow of knowledge into and out of the firm. Before proceeding, however, it is important to specify the empirical context of the research more clearly. (Birkinshaw, 2001)

Based on the paragraphs above one can come to conclusion that the Knowledge resources and their management is much different from the resources that are managed in the contemporary management contexts. Knowledge flows more freely between organizations to and from companies meaning different challenges to the knowledge management in general and external knowledge management especially.

**Outsourcing**

Many research papers take the term 'outsourcing' as given and do not define what they mean by it at all. However, it is a very ambiguous term used in many different contexts and with many different meanings. The relationships described as outsourcing relationships differ from each other on the level of depth, being simple 'subcontracting type relationships' or 'outsourcing partnerships' or anything between. (Kinnula, 2006)

A couple of examples of definitions for outsourcing are:

- Zhu *et al*. (2001) define outsourcing as "The process of transferring the responsibility for a specific business function from an employee group to a non-employee group."
- The definition given in Domberger (1998) is very similar, being "a process whereby activities traditionally carried out internally are contracted out to external providers".

The central point in these definitions, as well as in the others found in the literature, is that some business function(s) are performed by a third party. Zhu *et al.* (2001) and Domberger (1998) emphasize also the aspect of movement from in-house to external sourcing. The transferring of assets, in particular staff is also one common aspect of outsourcing, even though it is not essential to it.

The word "outsourcing" defines the process of transferring the responsibility for a specific business function from an employee group to a non-employee group (Zhu *et al.*, 2001). Outsourcing, gained popularity in eighteenth century England and has been in continuous use in a variety of forms ever since Outsourcing gained greater impetus in the 1970s, when large and diverse corporations were considered to be underperforming, a trend that became even more pronounced in the early 1980s with the onset of global recession (Duffy, 2001, Kakabadse and Kakabadse, 2000a 2000b). In fact, the 1980s witnessed a change of direction in business strategy thinking – namely, focusing on fewer activities (Peters and Waterman, 1982). As results, corporate managers reevaluated the organization needed to be vertically integrated and self-sufficient (Mullin, 1996). Thus, corporations divested "peripheral or supplementary" businesses in order to focus upon their "core" business and, in turn, become "in integrated" by increasingly outsourcing their requirements for components and business services (Grant, 2004). By the 1990s, the agenda was set, with the growing belief that quick wins could be achieved by pursuing "core" strategies (Prahalad and Hamel, 1990). Since then there has been numerous amount of unsuccessful outsourcing projects, but on the other hand there has been numerous amount of successful outsourcing projects. The outsourcing phenomenon has inspired many scholars to research it and publish about it. Current wisdom purports that an enterprise outperforms its competitors only if it can establish a sustainable desirable difference, whether by delivering greater value to customers or promoting comparable value but at a lower cost, or a combination of both. In order to be able to deliver greater value or comparable value at a lower cost the realization of the enterprise's advantage stems from the nature of the sourcing purpose and the manner in which organizational activities are sourced. Hence, the sourcing of organizational activities

holds significance both operationally strategically. (Kakabadse and Kakabadse, 2000b)

For the purpose of this research all these aspects have been included in the definition: of outsourcing as 'The process of transferring the responsibility for a specific business function from an employee group to a non-employee group, including transfer of assets, such as personnel'.

**Summary of the literature review**

Knowledge transfer relates to emulation and continuous learning from competitors in market or licensed from inventors. However the competitiveness of a company is improved not mainly via knowledge creating processes but via continuous learning (Figure 8). The available and economical transfers of matured knowledge will realize the same end. The great effort in decoding tacit knowledge in this course somehow becomes unnecessary. The division of knowledge transfer and knowledge creation determines a company's strategy positioning and allocation of resources.
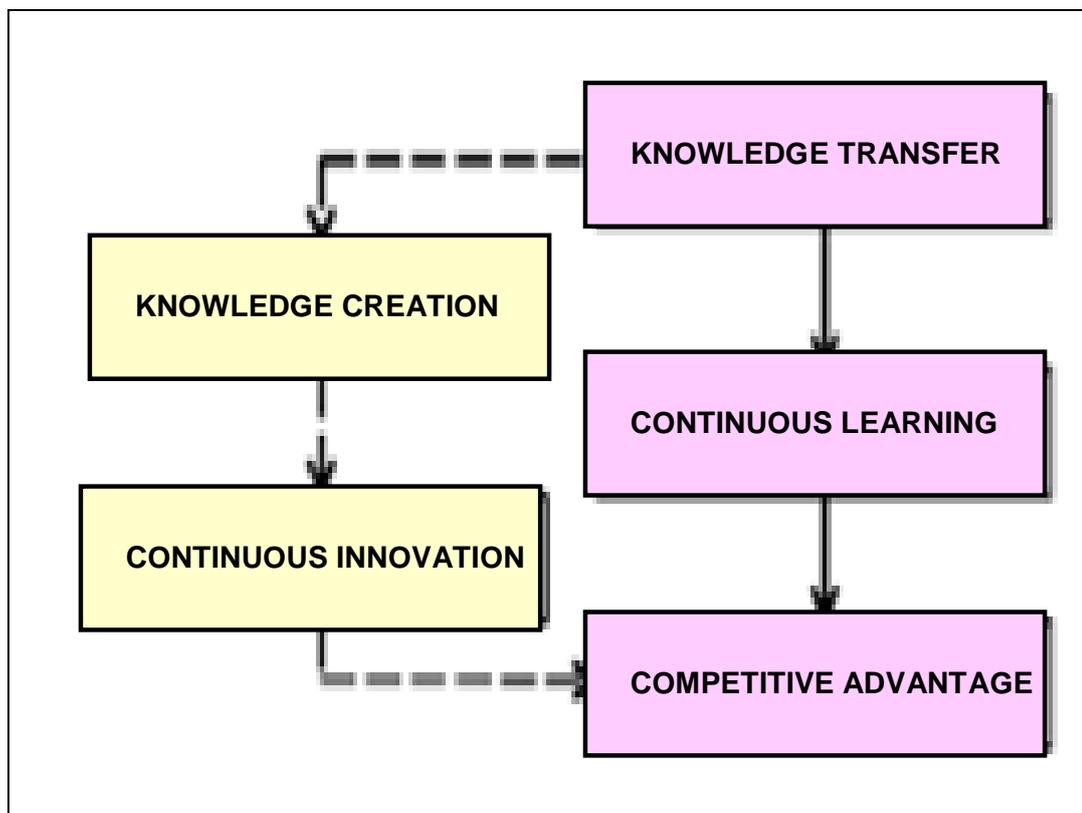
**Figure 8**  Knowledge transfer
**Source**: Li and Gao (2003)

The Knowledge Management is a multi-faced phenomenon and includes several aspects from the scientific as well as from the managerial points of view. The structures and models take into account the processes and the organizational questions. The methodologies included in knowledge management include aspects like identification, acquisition, structuring, generation, stocking, distribution and assessment (of content, quality, etc) of knowledge. The Knowledge Management takes into account also the system design from the technical points of view.

The literature cited in the literature review is a comprehensive picture of the various aspects of the Knowledge Management and will be utilized first in designing the empirical analysis (data collection and analysis) as well as in combining the earlier knowledge with the empirical findings of this research.

# MATERIALS AND METHODS

## Materials and technical infrastructure

The research material was collected through surveys and interviews. The surveys were carried out using the internet technology available i.e. through e-mails (Jones, 1999). The questionnaires were sent to the experts through e-mail and majority of the replies were received through the same media. A few respondents returned the questionnaires through the regular mail.

The interviews were conducted in three different ways:

a) The researcher carried out the interviews in person. Notes were drawn from the interviews. These notes were then used in the data analysis.

b) The supervising professor carried out some interviews and he wrote the notes from those interviews. These notes were then used in the data analysis.

c) A research assistant carried out some interviews. These interviews were taped and transcripted. The transcripted text as well as the original taped interviews were used in the data analysis.

The technical infrastructure used in the research was standard PC equipment with Microsoft Office software:

a) MS Word for documents
b) MS PowerPoint for finalizing the figures
c) MS Excel for making statistical calculations and drawing charts
d) MS Vision for drawing conceptual diagrams.
e) MS Outlook for managing the e-mail traffic between all stakeholders of the research.

Skype software was also used for audio communication with some of the stakeholders of the research.

**Methodology**

Introduction

This chapter describes the research design and methods used in this study. Choosing appropriate methods is a key element in any research work, and even more so in the field of industrial engineering and management research, where the choice of methods and strategies is wide and arguments between different schools of thought are frequent.

The term methodology is "a set or system of methods, principles, and rules for regulating a given discipline" Research methods, on the other hand, can be defined as consisting of all the practices and operations which the researcher uses to make observations, and of the rules by which these observations can be modified and interpreted in order to assess their meaning (Alasuutari, 1995). This includes the subcategories of data gathering methods (e.g. questionnaire) and analysis methods (e.g. statistical analysis).

The **research methods** applied in IEM have been classified by Olkkonen (1993). In the classification the research methods have been divided into two main categories: theoretical and empirical research. Theoretical research includes the following methods: concept analytical, theoretical modeling, theory modification, new theory generation and theoretical reviews. The empirical research includes classes: explorative research, explanatory research, descriptive research, experiments, predictive research, evaluations, developments and action research as well as constructive research. This research falls into the concept analytical group of studies.

Concept Creation Method

According to Lauer (2001) semantics is a study of how we perceive, make meaning of, articulate and communicate our experiences. When a researcher applies a word to an object or event to be researched, (s)he is not designating what the thing is.

The word we use is only a symbol, like a map, which describes a territory. Words that the researcher uses to describe the research target are abstractions; i.e. they reflect a selection of features of the research target that they consider to be the most important. What one researcher abstracts (selects, notices, highlights) from his or her environment may be quite different from what someone else abstracts; yet, both may use the same label. (Lauer, 2001)

In semantics the concept of meaning is usually divided into two categories: intended meaning and conventionally agreed meaning (Risjord, 1996). In the research of the communicative system the intended meanings of researchers are not so important, as we know that the communication is bi-directional where the understanding of the meaning goes backward (Stichweh, 2000). Therefore, an etymological analysis or a semantic analysis trying to define the original meaning of the concept is useless. The analysis can capture the conventionally agreed meanings only as they are embedded into the metaphorical concepts that are described in metaphorical expressions.

The concept creation method has been described Tesch (1990), which is described in 'engineering terms' in the Figure 9.
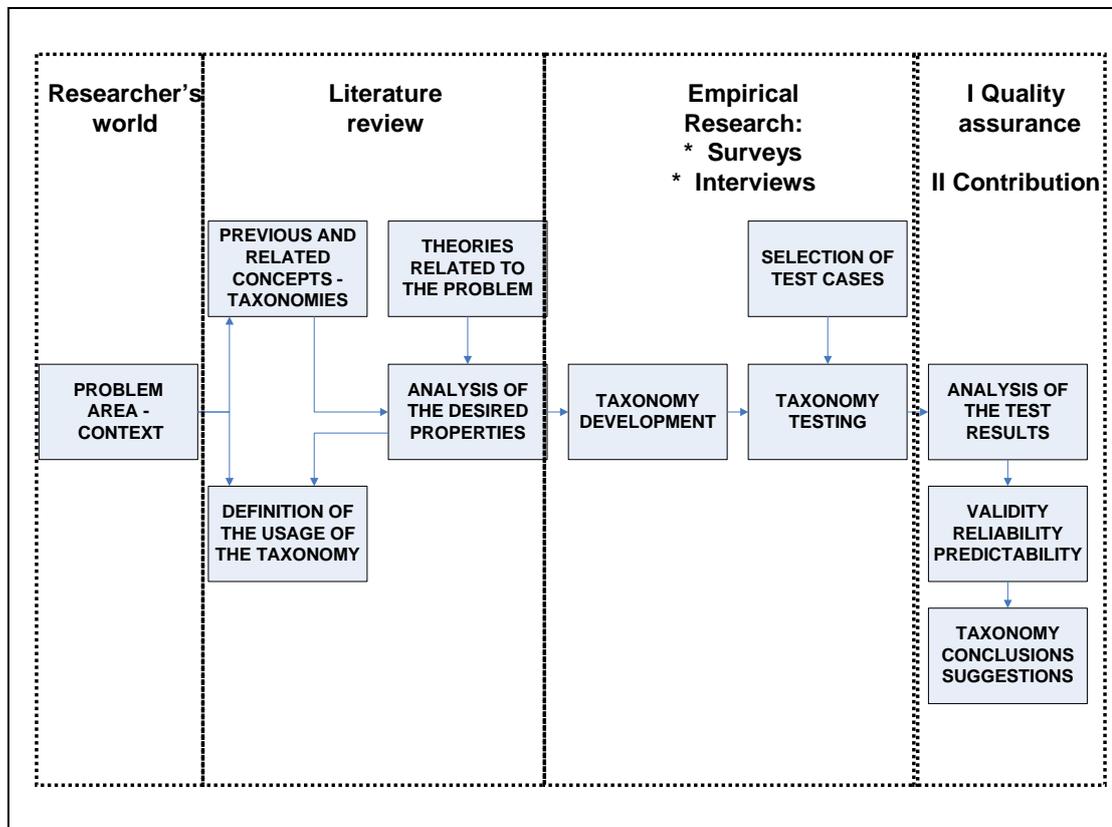
**Figure 9** Concept creation research process

The aim of the analysis is to reduce the complexity of the research field by identifying the paradigmatic structures of the research and to clarify the diverse meanings and usage of the concepts for the future research. It is not an intention to create, test or validate any new theory explaining any phenomenon at the empirical level. One theoretical advantage of the concept analysis is to help researchers from different disciplines to grasp the concepts and problems of the cross- disciplinary field and establish a shared understanding for the research in different disciplines.

De Vries *et al.* (1995) suggest that in the analysis the content could be broken down into smaller units of meaning. Each unit of meaning can represent a separate idea or part of the information contained in the content. The idea of breaking down the content into units of meaning and then dealing with these rather than with whole

messages arises from the belief that expressions vary considerably in nature: some may contain a single concept, while others convey a wealth of information and ideas. (Pulkkinen, 2003)

A useful overview of the six major sources considers their comparative strengths and weaknesses in the Table 15. (Yin, 1994).

**Table  15**  Data source comparison

| Source of evidence | Strengths | Weaknesses |
|---|---|---|
| Documentation | • stable -- can be reviewed repeatedly<br>• unobtrusive -- not created as a result of the case study<br>• exact -- contains exact names, references, and details of an event<br>• broad coverage -- long span of time, many events, and many settings | • retrievability -- can be low<br>• biased selectivity, if collection is incomplete<br>• reporting bias -- reflects (unknown) bias of author<br>• access -- may be deliberately blocked |
| Archival records | • (same as above for documentation)<br>• precise and quantitative | • (same as above for documentation)<br>• accessibility due to privacy reasons |
| Interviews | • targeted -- focuses directly on case study topic<br>• insightful -- provides perceived causal inferences | • bias due to poorly constructed questions<br>• response bias<br>• inaccuracies due to poor recall<br>• reflexivity -- interviewee gives what interviewer wants to hear |

**Table 15** (Continued)

| Source of evidence | Strengths | Weaknesses |
|---|---|---|
| Direct observations | • reality -- covers events in real time<br>• contextual -- covers context of event | • time-consuming<br>• selectivity -- unless broad coverage<br>• reflexivity -- event may proceed differently because it is being observed<br>• cost -- hours needed by human observers |
| Participant-observation | • (same as above for direct observations)<br>• insightful into interpersonal behavior and motives | • (same as above for direct observations)<br>• bias due to investigator's manipulation of events |
| Physical artifacts | • insightful into cultural features<br>• insightful into technical operations | • selectivity<br>• availability |

**Source**: Yin (1994)


**The survey**


Surveys have by and large been the predominant research method in social sciences. The history of using surveys to gather data goes back to the nineteenth century. The most commonly used data gathering method in survey studies is the questionnaire, as it is usually the easiest way of ensuring a structured data matrix needed for analysis of the survey data. The relevant data can, however, be collected by other means as well, including structured interviews and in-depth interviews (de Vaus, 1991).

Survey research is quantitative by nature, based on the statistical analysis of standardized data gathered from a relatively large number of objects. Use of surveys requires the explicit operationalizing of variables so that a quantitative measurement can be done (Tainio, 1978). Surveys provide a snapshot of practice or attitudes across a number of respondents at a point in time, unless multiple surveys of the same sample in different points of time are used. The major strength of survey research is, provided there is an appropriate sample size and structure, the generalizability of the conclusions.

The weaknesses of the survey method are connected with the possible bias of the sample, high dependence on the pre-survey selection of issues to be studied, and its inability to provide insight regarding the causes and processes behind the phenomena being studied (Westbrook, 1995). Questionnaire surveys are especially vulnerable to sample bias, as the respondents will be at least partly self-selected which is usually seen as leading to bias towards "positive" or "good" cases. The selection of survey questions restricts the issues that can be studied, and there is usually relatively little chance of acquiring more data about interesting issues that have arisen from the original data or probing the issues any deeper (Sheatsley, 1983). This problem does not fully disappear even by extending the data gathering methods beyond questionnaires, as in survey research it is important that similar data is available from all the cases forming the data matrix. Thus following some interesting lead in an interview and using the data so discovered would require going back to other cases and looking for similar data from them as well.

Surveys have also been widely criticized for their inability to adequately establish causal connections between variables, the incapability of addressing the meaningful aspects of social action, neglecting the contextual issues of social phenomena, and neglecting the role of human consciousness and intentions. All these are real risks, but they can be minimized or even eliminated by the thorough and careful planning of the survey (de Vaus, 1991). How surveys are often used as opposed to the survey method *per se* is more likely the cause of the problems leading to the critique brought forward.

Surveys are at their best in producing information about attitudes, values and opinions of individual persons within some system. Comparing different organizations by survey data is more problematic, as the data concerning as complex a system as a human organization have to be produced by a limited number of respondents viewing the issues from their personal point of view. Survey research is also incapable of describing phenomena that people either are unconscious of or do not want to reveal their perceptions of (Tainio, 1978, Sheatsley, 1983).

In spite of the weaknesses and risks of the survey method in studying actual incidents in multiple organizations, surveys can be regarded as an effective way of examining relationships and dependencies between certain actions and change project success. The aforementioned risks have to be kept in mind from the study design throughout the analysis to making conclusions.

**The Interview**

One of the most important sources of case study information is the interview. The interview is the main road to multiple realities (Stake, 1995). Interviews, which may be open-ended, focused or in the form of survey (Yin, 1994).

Case study interviews are of an open-ended nature, in which you can ask key respondents for the facts of a matter as well as for the respondents' opinions about events. In some situations, you may even ask the respondent to propose his or her own insights into certain occurrences and may use such propositions as the basis for further inquiry. Key informants are often critical to the success of a case study.

A focused interview is one of in which the informant is interviewed for a short period of time, for example an hour. Although such an interview will frequently be reasonably open-ended and informal in manner, the researcher will be following an interview schedule or set of questions.

A third type of interview entails more structured questions, along the lines of a formal survey. Such a survey could be designed as part of a case study. This type of survey would involve both the sampling procedures and instruments used in regular surveys, and it would subsequently be analyzed in a similar manner.

Interviews are an essential source of case study. However, they are verbal reports only and as subject to the problems of bias as well as poor recall, and poor or inaccurate articulation. A reasonable approach is to corroborate interview data with information from other sources.

**Expected results**

The aim in this research is to construct taxonomy to cover the various aspects of company external knowledge. The structure of the taxonomy will be the hierarchical one. The result out of the research is a three level taxonomy. On the highest level the target is to define the roles describing the categorization of the external knowledge. On the second level the purpose is to define the specialties that relate to the role in question. And at the third level a further detailed description of the specialty will be drawn how it appears based on the research carried out. Schematically the taxonomy can be presented as in Figure 10.
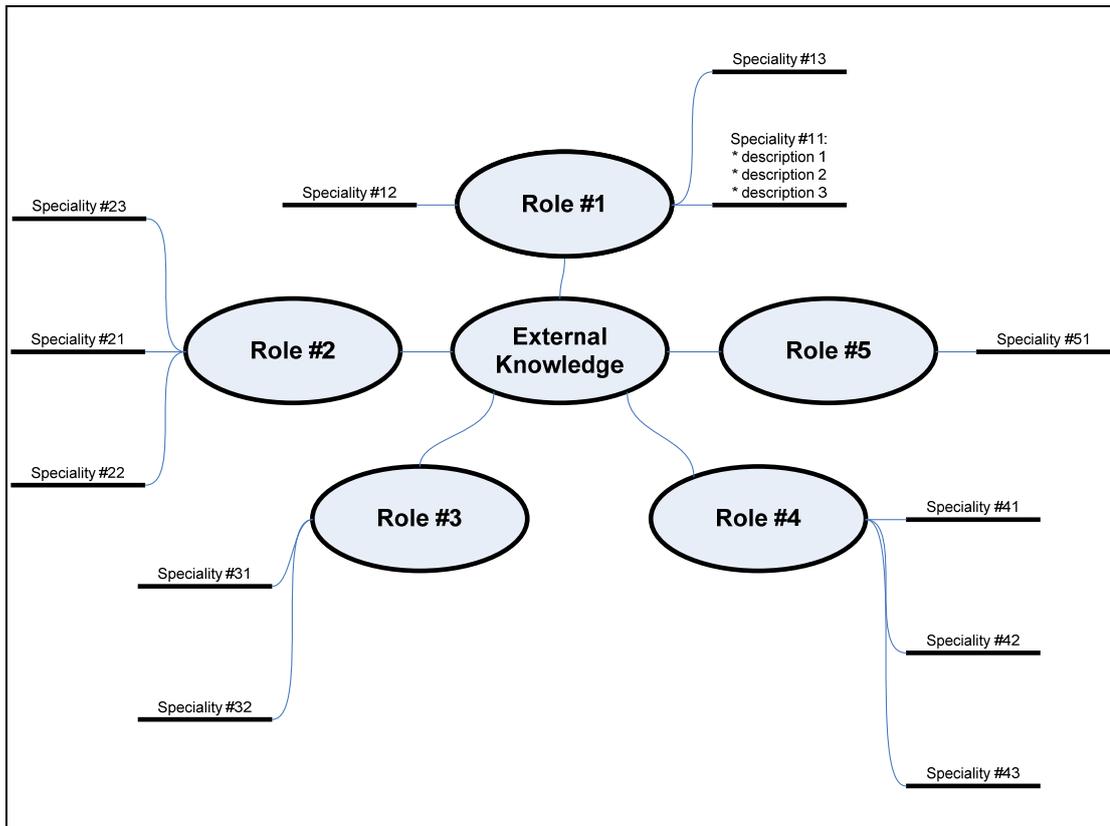
**Figure 10** Taxonomy structure

**Quality Assurance of the Research**

The quality assurance of the research is based on the assessment of the

- validity
- credibility
- transferability
- dependability
- conformability
- predictability

of the research.

In the following paragraphs those aspects are described in more detail.

Validity

In the concept creation research methodology one could utilize the validation logic of the constructive research approach. There the validation of a solution from a research is often done by so − called market tests (Kasanen *et al.*,1991):

- A weak market test
- Semi − strong market test
- Strong market test

It is especially relevant to the constructive research approach to test the market value of the framework. The weak market test is based on whether economically responsible managers are ready to accept the model to support decision making in real situations. The final assessment of the value of the research work is usually however left to the readers, who may or may not find the new knowledge and concepts and the taxonomy created useful and practical.

Here also another way by Johnson (1997) will be used. The validity of the research will be defined in general but also in a manner applicable to this research which based on the principles of the concept creation. Table 16 summarizes the strategies that can be used to promote the validity of the research.

**Table 16**  Strategies used to promote qualitative research validity

| Strategy | Description |
|---|---|
| Researcher as "Detective" | A metaphor characterizing the qualitative researcher as he or she searches for evidence about causes and effects. The researcher develops an understanding of the data through careful consideration of potential causes and effects and by systematically eliminating "rival" explanations or hypotheses until the final "case" is made "beyond a reasonable doubt." The" detective" can utilize any of the strategies listed here. |
| Extended fieldwork | When possible, qualitative researchers should collect data in the field over an extended period of time. |
| Low inference descriptors | The use of description phrased very close to the participants' accounts and researchers' field notes. Verbatim (i.e., direct quotation) is a commonly used type of low inference descriptor. |
| Triangulation | "Cross-checking" information and conclusions through the use of multiple procedures of sources. When the different procedures or sources are in agreement you have "corroboration." |
| Data triangulation | The use of multiple data sources to help understand a phenomenon. |
| Methods triangulation | The use of multiple research methods to study a phenomenon. |

**Table 16**  (Continued)

| Strategy | Description |
| --- | --- |
| Investigator triangulation | The use of multiple investigators (i.e., multiple researchers) in collecting and interpreting the data. |
| Theory triangulation | The use of multiple theories and perspectives to help interpret and explain the data. |
| Participant feedback | The feedback and discussion of the researcher's interpretations and conclusions with the actual participants and other members of the participant community for verification and insight. |
| Peer review | Discussion of the researcher's interpretations and conclusions with other people. This includes discussion with a "disinterested peer". This peer should  play the "devil's advocate," challenging the researcher to provide solid evidence for any interpretations or conclusions. |
| Negative case sampling | Locating and examining cases that disconfirm the researcher's expectations and tentative explanation. |
| Reflexivity | This involves self-awareness and "critical self-reflection" by the researcher on his potential biases and predispositions |
| Pattern matching | Predicting a series of results that form a "pattern" and then determining the degree to which the actual results fit the predicted pattern. |

**Source**: Johnson (1997)

Credibility

The credibility of the research is based on the quality of the

- literature used
- research process used
- empirical data collected
- analysis method used.

Partly the credibility is dependent also on the quantity in addition to the quality of the materials.

The research is based on empirical data. The main data sources were the literature review, survey and interviews.

Predictability

Predictability is closely linked to information gathering and information analysis. Information gaps reduce predictability. On the other hand Strauss and Corbin (1994) argue that predictability for any proposed theory is limited in the sense that "if elsewhere approximately similar conditions obtain, then approximately similar consequences should occur" This statement is assumed to hold in constructive theory building as well as in grounded theory as described by Strauss and Corbin (1990, 1994).

Another face of design practice involves efforts to render the outcomes of design predictable. Predictability is created by the effective response to problems, and it has similarities to science, engineering, and technology. The basis of Simon's concept of design science is the idea of applicable theories of how to devise courses of action aimed at changing existing situations into preferred ones. This science is geared to industrial production, including production in the digital industries of the knowledge economy. (Friedman, 2003)

A theory explains how 'something' works and can predict how 'something' will behave under specific conditions. Theory development means formulating a consistent system of statements that unify, enlarge and deepen ideas, which had, before, been more or less intuitive and disconnected. Engelen and Zwaan (1994) describe two theory trajectories: *theory development* and *theory application*, as in Figure 11.
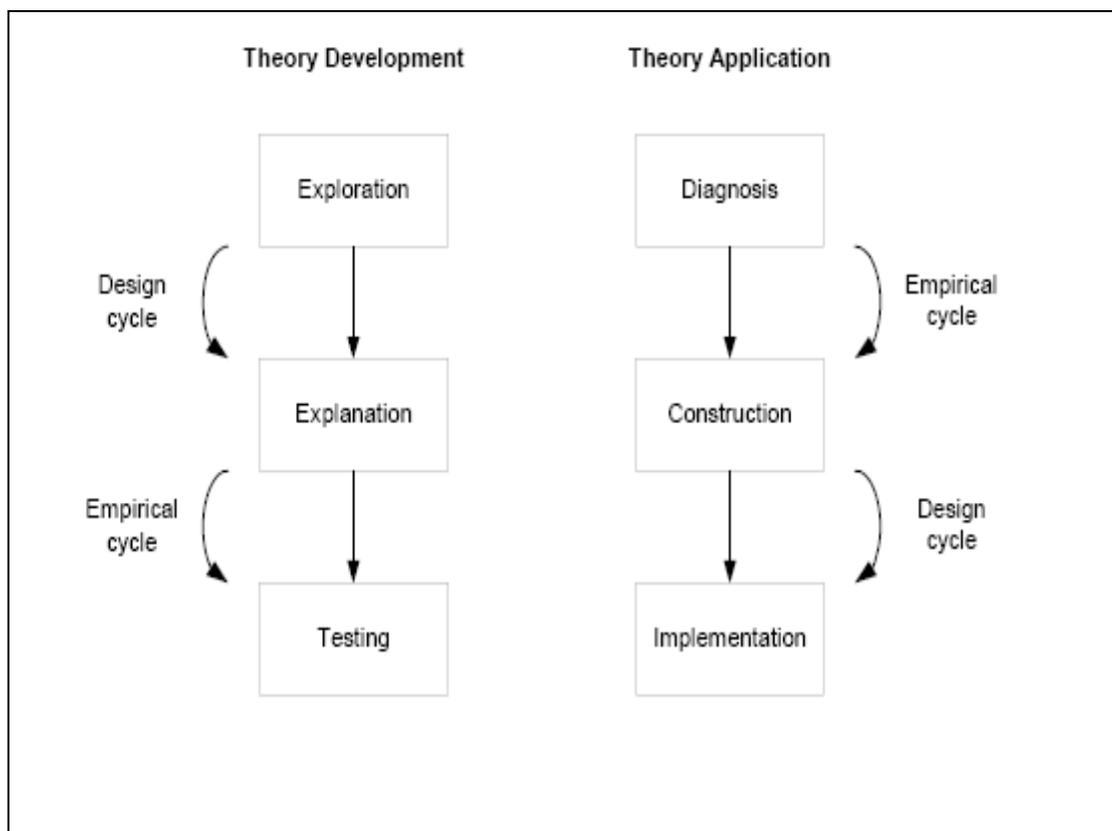


**Figure 11**  Development and of theory
**Source**: Engelen and Zwaan (1994)

Engelen and Zwaan (1994) distinguish two main research cycles for management studies:

1. *Empirical cycle*. With five steps:
    1) Research goal,

2) Research design,

3) Data collection,

4) Data analysis, and

5) Reporting.

2. *Design cycle*. Also with five steps:

1) Design goal,

2) Design specifications,

3) Generation of different designs,

4) Selection from different designs, and

5) Reporting.

The theory development trajectory has three basic steps:

$$Exploration \;\rightarrow explanation \;\rightarrow testing$$

Using existing theory and practices, a new theory is constructed that should describe reality, preferably with a high predictability. This theory is tested in reality to determine if the theory can be confirmed or rejected, thus answering the question 'Is it correct?'

The theory application trajectory also has three steps:

$$diagnosis \rightarrow \; construction \;\rightarrow implementation$$

A problem is diagnosed, the problem is accurately defined and theories to improve the unwanted situation are determined. The theories are then applied to create a potential solution for the problem and this solution is implemented, thus answering the question 'Does it work?' (Sassenburg, 2006)

Reliability

The reliability of the concept creation research is about the capability of the research to produce non-random results. It is assumed that creating a concept in one setting it will work in another.

## RESULTS AND DISCUSSIONS

### Results

**Introduction**

The Empirical part of the research is designed based on the model of the concept creation as was described in Figure 9. The timining of the empirical part was described in Figure 3. The empirical part consists of a survey and interviews.

**Data collection**

The data collection for the research is schematically presented in the Figure 12. The figure shows the various data elements that are used in the analysis and further in the taxonomy development.
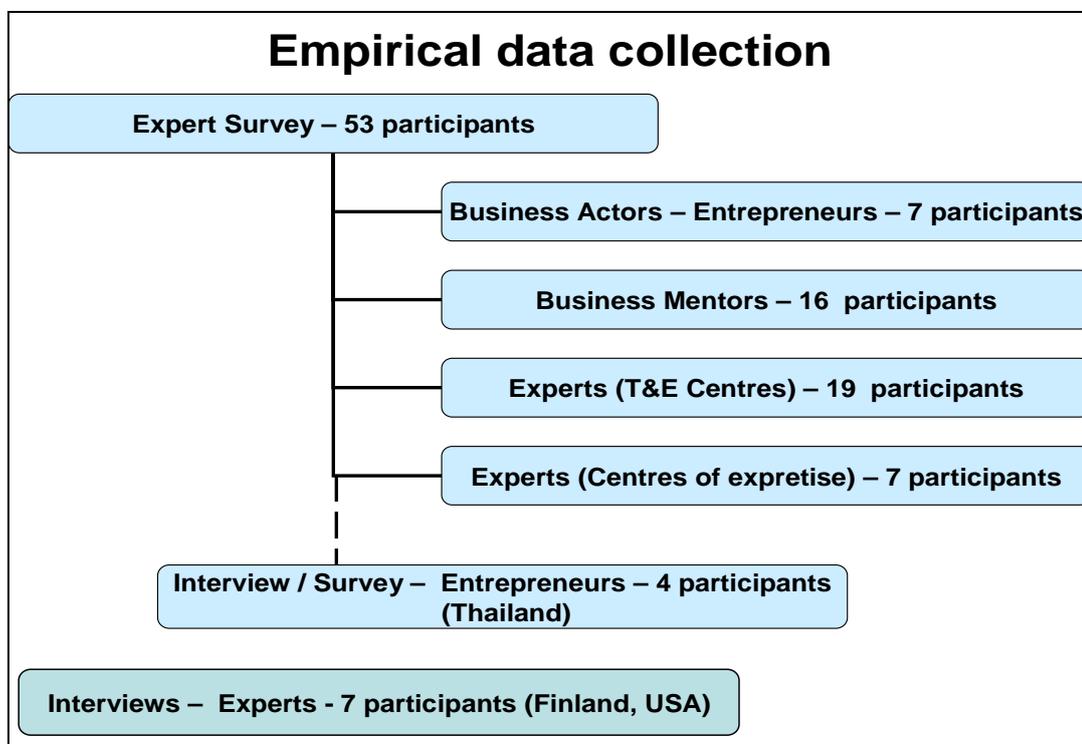


**Figure 12** Empirical data collection

The Survey

## Population

The survey was carried out in most parts in Finland in 2004-2005 and partly in Thailand in 2006-2007. Survey Participants (total number: 53) consists of five different groups relevant to the study (Figure 13).
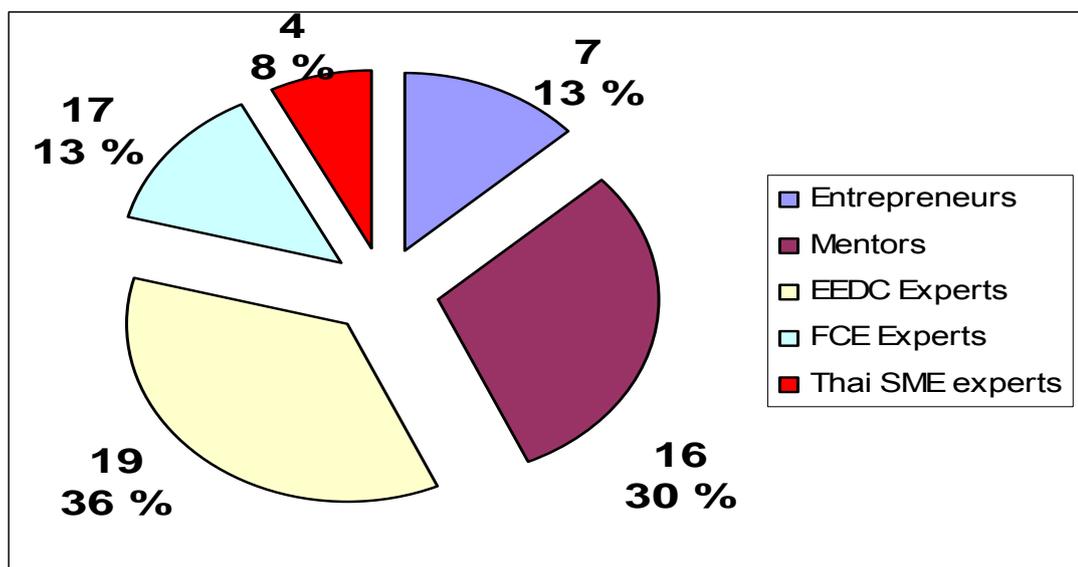


**Figure 13**  The participants of the survey by background

The first group consists of 7 entrepreneurs in a Mentor-Actor project.  This group really looked for ways in which mentors can help entrepreneurs in their business challenges. The entrepreneurs represented very small businesses with very limited resources both physical, financial and knowledge resources.

**Table 17** Entrepreneurs

| Position | Affiliation |
| --- | --- |
| Entrepreneur, CEO | PJ Microwave Oy |
| Entrepreneur, CEO | Ekopine Oy |
| Entrepreneur, CEO | Avian Oy |
| CEO | Bluepoint Oy |
| Entrepreneur | Own small business |
| Entrepreneur  - Cosmetician | Own small business |

The second group is the 16 mentors. These people belong to the Finnish Association of business mentors.  They have long experience in various businesses and are willing to help also others in their business bottle necks and also in opening new opportunities.  A brief description of the mentors is in Table 18.

**Table 18** Mentors

| Position | Affiliation |
| --- | --- |
| Professor | Lappeenranta Technical University |
| Tilintarkastaja / yrittäjä (Chartered Accountant / Entrepreneur) | Own company |
| CEO | Own company |
| Retired CEO | - |
| Business consultant | Own company |
| Chairman and member of Board(s) | Several companies |
| Sijoitusjohtaja (Director of Investments) | Nordea Bank |
| CEO | Own company |
| CEO | GW Sohlberg Oy |
| CEO | DISC Botnia Oy |

**Table** 18 (Continued)

| Position | Affiliation |
|---|---|
| Retired CEO | - |
| Retired CEO | - |
| Project Manager /Director / Spouse of an entrepreneur | MSP Oy |
| Consultant, CEO | City Consulting |
| Retired CEO | - |
| Johtaja / Chief advisor | MTV Oy |

The third group is the 19 experts from the T&E Centers (Employment and Economic Development Centers). The Ministry of Trade and Industry, the Ministry of Agriculture and Forestry, and the Ministry of Labor in Finland have jointly combined their regional forces in the Employment and Economic Development Centers. Fifteen centers countrywide provide a comprehensive range of advisory and development services for businesses, entrepreneurs, and private individuals. Tasks of the centers have been defined as:

- to support and advise small and medium-sized enterprises at the various stages of their life cycles
- to promote technological development in enterprises and assist in matters associated with export activities and internationalization
- to implement regional labor policies
- to plan and organize adult training within the official labor policy framework
- to promote and develop farming and rural enterprise activities
- to develop fisheries
- to influence and participate in regional development in general

The Employment and Economic Development Centre is a significant specialist and contributor of EU funding. Each Centre also develops EU co-operation in its own area.

**Table 19** EEDC experts

| Position | Affiliation |
| --- | --- |
| Erikoissuunnittelija (Senior Planning Officer) | EEDC of Lapland |
| ESR-koordinaattori (ESF coordinator) | EEDC of Northern Karelia |
| ESR-kordinaattori (ESF coordinator) | EEDC of Ostrobothnia |
| Kehittämispäällikkö (Development Manager) | EEDC of Southern Savonia |
| Kehittämispäällikkö (Development Manager) | EEDC of Southern Ostrobothnia |
| Kehittämispäällikkö (Development Manager) | EEDC of Kainu |
| Kehittämispäällikkö (Development Manager) | EEDC of Northern Karelia |
| Osastopäällikkö (Head of Department) | EEDC of Pirkanmaa |
| Osastopäällikkö(Head of Department) | EEDC of Northern Ostrobothnia |
| Projektikoordinaattori (Project coordinator) | EEDC of Ostrobothnia |
| Projektipäällikkö (Project Manager) | EEDC of Northern Ostrobothnia |
| Projektipäällikkö (Project Manager) | EEDC of Northern Ostrobothnia |
| Suunnittelija (Planning Officer) | EEDC of Southern Ostrobothnia |
| Vientiasiamies (Foreign Business Advisor) | EEDC of Lapland |
| Vientiasiamies (Foreign Business Advisor) | EEDC of South West Finland |

**Table 19** (Continued)

| Position | Affiliation |
| --- | --- |
| Vientineuvoja (Foreign Business Advisor) | EEDC of Northern Ostrobothnia |
| Yrityspalvelupäällikkö (Manager of Business Services) | EEDC of Kainuu |
| Yritystutkija (Business Analyst) | EEDC of Northern Ostrobothnia |
| Yritystutkija (Business Analyst) | EEDC of Southern Ostrobothnia |

The fourth group is 7 experts from the Finnish Centers of Expertise (FCE). The Centre of Expertise Program was launched in 1994. There currently exist 22 centers of expertise covering 45 fields of expertise. The task of the centers of expertise is to use internationally competitive knowledge and skills as a resource for business activities, the creation of new jobs and regional development. In order to reach their objective, the centers of expertise:

- establish the prerequisites for the creation and commercialization of innovation
- launch cooperative projects between the research sectors and industries
- continuously strengthen and modernize top-level expertise in the region
- promote the development of creative and innovative environments.

**Table 20**  Experts at the FCE's

| Position | Affiliation |
|---|---|
| Development Manager | Kokkola Center of Expertise |
| Director | Jyväskylä Region Center of Expertise |
| Project Manager | Prizztech Oy |
| Industry manager (Toimialajohtaja) | Western Finland Center of Expertise |
| Project Manager | South western Finland Center of Expertise |
| Industry manager (Toimialajohtaja) | Jyväskylä Region Center of Expertise |
| Technology Specialist | Seinäjoki Center of Expertise |

The fifth group are 4 managers from Thai SME's. They provided the view from a different business culture compared to the larger Finnish group of informants.

**Table 21**  Experts from Thai SME's

| Position | Affiliation |
|---|---|
| General Manager | K.M. Packaging Co. Ltd |
| Managing Director | SME |
| Managing Director | Bangkok Interfood Co. Ltd |
| Managing Director – owner | SME |

**Questionnaires**

The questionnaires were designed based on the theoretical background. Each of the Finnish target groups were addressed in a slightly different ways taking into account the background of the respondents. The questionnaire itself in all groups contained 24 separate questions as described in Appendix A.  The questionnaire used with the Thai companies was slightly different and described in Appendix B.

**Data Collection**

The questionnaires were sent by e-mail to all groups of experts. Most of the experts replied back by e-mail with filled form. Some did return the form in regular mail. In the case of some experts additional information was asked about the research and that was supplied. Also the final results of the research were promised to be sent to each participant.

The questionnaires were mostly based on a thematic approach and were applied to the business external knowledge. However there was also an attempt to inspire the expert to let his/her thoughts to go more freely. With this idea in mind a grounded theory approach was also used to analyze the answers.

To the question about the starting stage and the demand and supply of external expertise one expert from a TE center replied:

- "Sekalaista kaikkea maan ja taivaan väliltä" ("All sorts between heaven and earth").
- "Tähän löytyy itseään kehuvia konsultteja antamaan itsestään selviä neuvoja korkeaan hintaan" ("Here we can find consultants who brag themselves and give trivial advice at very high price").
- "Yrityksille on ProStartteja yms. Kuuleman mukaan ovat keveitä ohjelmia. Uusyrityskeskuksia on myös, kuuleman mukaan anti on ollut kehnoa. Yrittäjänä mietin, että miksi on niin monta päällekkäistä / rinnakkaista organisaatiota, joiden anti on keskinkertaista tai kehnoa. Kannattaisi keskittää voimia ja saada jäntevää apua ongelmiin" ( "There are ProStart's etc. for the companies. What I've heard is that they are very easy programs. There are also New Business Centers, what I've heard is that they performance has been poor. As an entrepreneur I wonder why there are so many overlapping and parallel organizations whose services are either fair or poor. It would make sense to concentrate all efforts and get more vigorous help to the problems.")

"Itse en hallitse numeroita, joten odotan mentorini osaavan ne (osaa!)" (" Me myself I do not manage numbers, so I expect my mentor to mange them (s)he does!").

The answers from all respondents totals of some 500 pages of data giving a comprehensive picture of the expertise (external knowledge) which is used, could be used and should be used to the business benefits of SMEs.

## Data Analysis

The all collected data was accumulated to one complete set of answers. The approach to analyse the data was that of the Grounded Theory ( Pandit, 1996; Strauss and Corbin, 1990, 1994). Originally Grounded Theory (Glaser and Straus 1967) was designed to advance the legitimization of qualitative research by articulating a rationale for theory that was grounded, i.e., "generated and developed through interplay with data collected during research projects," while setting forth both the specifics and logic for such theories (Strauss and Corbin, 1990). Grounded Theory was anchored first and foremost in the notion that among concepts and sets of concepts there could be proposed plausible relationships that would constitute a theory—and that these relationships only had to be plausible since that is what would be reinforced through future research. "Without concepts, there can be no propositions, and thus no cumulative scientific (systematically theoretical) knowledge based on these plausible but testable propositions" (Strauss and Corbin, 1990, Strong 2005)

The methodology aims at generating conceptually dense theories on the part of researchers, wherein there are many conceptual relationships that are stated as propositions subject to future testing. These propositions, as with most other qualitative methodology, are to be presented in the context of thick conceptual and descriptive discourse. What the researcher is looking for are patterns of action and interaction among and between the various actors and activities in the studied social activity. Predictability for any proposed theory is limited in the sense that "if

elsewhere approximately similar conditions obtain, then approximately similar consequences should occur" (Strauss and Corbin, 1990, Strong 2005)

In attempting to assess the relationship of theory to reality and truth, Strauss and Corbin (1994), offer a series of observations. First, they argue that truth is enacted. Theories are interpretations made from given perspectives as adopted or researched by researchers. To say that a given theory is an interpretation—and therefore fallible—is not to deny that judgments can be made about the soundness or probable usefulness of it.

Strauss and Corbin (1994) also suggest that there are twofold temporal limits to all interpretations, whether or not they are theories. In the sense that first, they can not ever be permanently established—always being subject to qualification, elaboration, and ultimately, negation; and second, that like most other kinds of knowledge, they are limited in time, i.e., they are created by human beings located in certain a milieu founded on particular ideologies and ideas—they exist in history. (Strong 2005)

Grounded theory shares many similarities with other methodologies of the qualitative research genre. Foremost among these is the notion that social science is both desirable and possible. Other similarities are the types of data sources and the acceptance of responsibility for the interpretive role of the researcher.

The major difference between this methodology and other approaches to qualitative research is its emphasis upon theory development. Researchers can aim at various levels of theory when using grounded theory procedures.

The naturalistic technique of Grounded Theory creation advanced by Strauss and Corbin (1998), departs from what are sometimes characterized as the dominant rationalistic-deductive practice of testing existing theories. Grounded Theory urges the researcher to inductively generate a theory to explain systematically collected data—that is, the theory is grounded in data collected, not deduced from a priori

assumptions. In addition, while grounding concepts in data is the main feature of this method for Strauss and Corbin, the creativity of the researchers themselves and the interplay between the data and the researcher as analysis, are also essential ingredients.

The concept of "researcher as primary tool" is an essential ingredient in any Grounded Theory methodology and references to "researcher as instrument" are replete in the literature (Strong 2005). Punch (1994) argues that an absolutely central point of much field research is that it is: dependent on one person's perception of the field situation at a given point in time, that that perception is shaped both by personality and the nature of the interaction with the researched, and that this makes the researcher his or her own "research instrument."

"All knowledge and claims to knowledge are reflexive of the process, assumptions, location, history, and context of knowing and the knower" (Altheide and Johnson, 1994) the researcher can only rely on an asserted and unrelenting consciousness of these factors to claim that the accounts herein accurately represent to the best of his ability the features of the phenomena that they are intended to describe, explain, and theorize.

Schemantically the process of analysis is presented in the Figure 14 and the detailed analysis of the survey results is presented in the Appendix C.
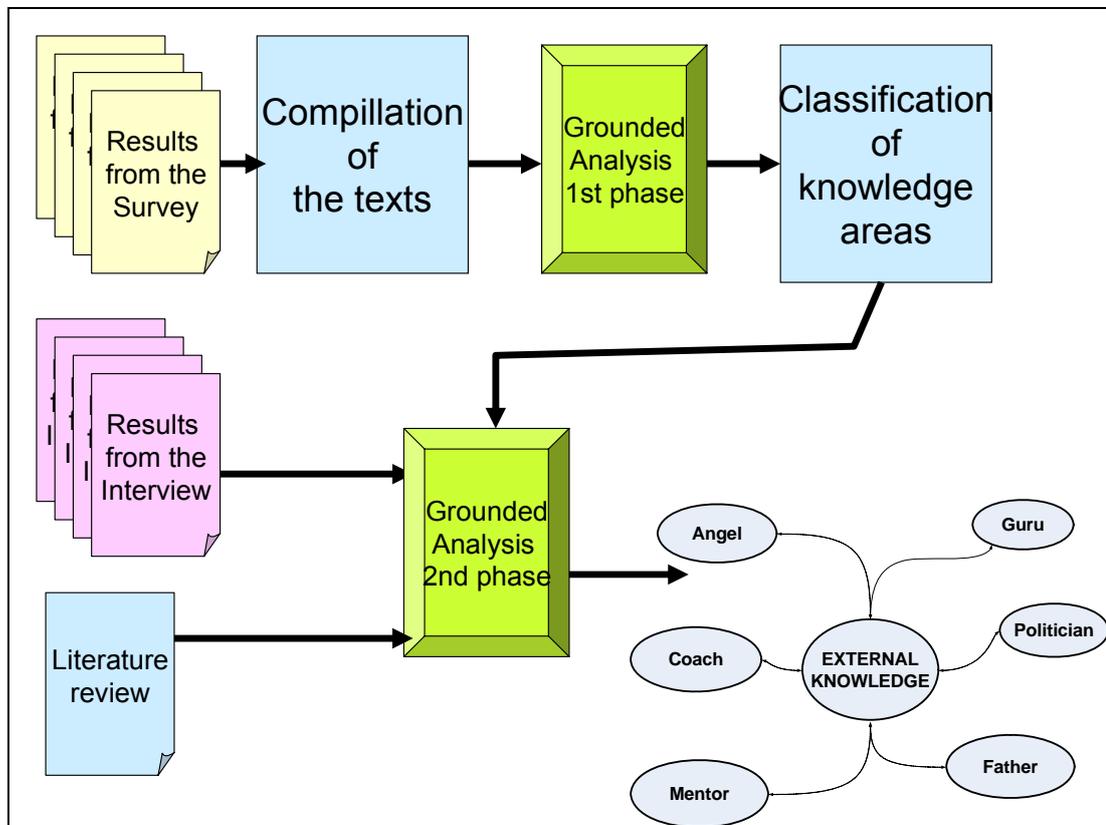
**Figure 14** The process of analysis of the empirical data

The answers showed that the respondents had different views on the various phases of the life cycles (Figures 15-16). The survey gave a total of 481 examples of external expertise used by SME's. This was distributed so that 155 examples of external expertise was proposed to the idea phase, 62 to the start-up phase, 179 to the growth phase, 53 to the mature phase and 32 to the declining phase. The reasons behind to the variance can by many folds:

- Companies in average in reality require external knowledge in different forms and volumes in different stages of the life cycle
- The basic assumption (bias) is that companies in the early phases need more external knowledge than later when they are more mature

- The respondents work more with and in companies that are in the early stages of their life cycle.

- The respondents did not think the different phases in a similar way – for instance the difference between the idea and start-up can be rather fuzzy without proper definitions. Same applies to the other transitions: from start-up to growth, from growth to maturity and finally from maturity to decline.

- The respondents had difficulties in answering so extensive questionnaire and they used larger portion of their time and energy in answering the first questions than the last ones.
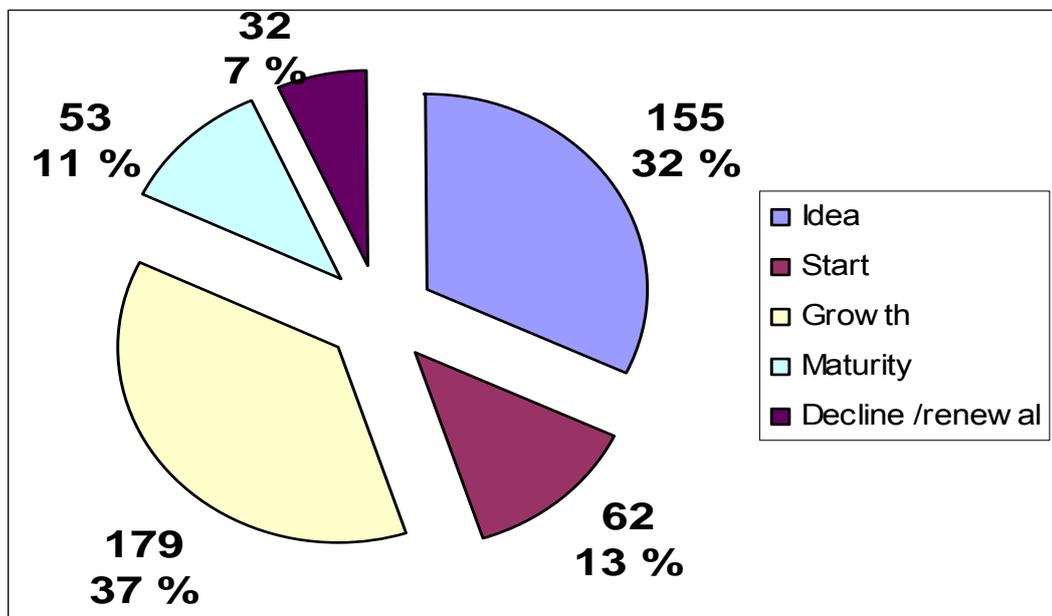


**Figure 15** Knowledge area distribution between life cycle stages

The survey indicated that 'Marketing', which was mentioned 81 time and 'Financial Management', which was mentioned 80 times, are the two most important knowledge areas, where SME's could use external knowledge for their needs. The next two in the ranking are 'Operations Management' (62 times) and 'Business Planning' (61 times). The third group of about same importance is 'strategic management' (39), 'Research and Development' (32) and 'People Management' (28). The rest items that received support are less important in the 'pig picture', but still can be of great importance to some companies in some periods of time.

As a summary of the types of expertise that are sought from external sources based on the survey can be presented as in Figure 16.

The data from the Appendix C (Table 22) is on nominal/ordinal scale. The knowledge areas being on nominal scale and the stages on the ordinal scale. Testing the data with Chi-Square test ( Mendenhall 1986, Newbold, 1991, Ott, 1988) by placing the hypotheses as follows:

H0:  the knowledge areas between stages are not related

H1:  the knowledge areas between the stages are related

The calculation gives the $x^2$ value of 177,67 with df = 76 and p < 0,0001. This means that we keep the H0 and reject the H1 and further it can be concluded that the knowledge areas are statistically not related.

In order to find out if the difference between the various stages is statistically significant, a combined non-parametric Friedman / Wilcoxon test was performed. The hypothesis was set as follows:

H0:  the cited of knowledge under 5 stages are not different.

H1:  at least 2 states have difference in the cited of knowledge.
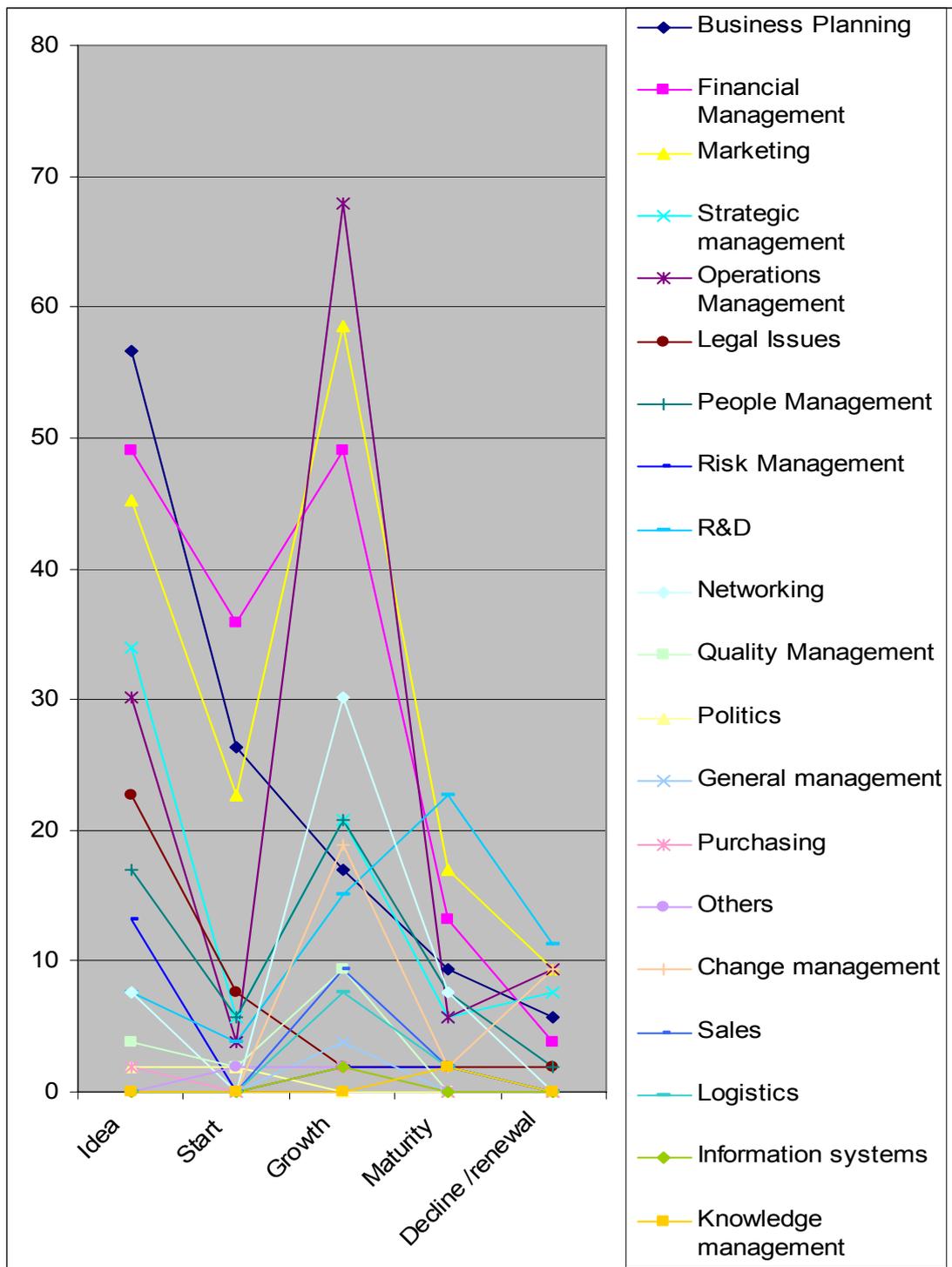
**Figure 16** External expertise identified in the survey

**Table 22** Responses of the experts to the knowledge areas

| Knowledge category | Idea | Start | Growth | Maturity | Decline |
|---|---|---|---|---|---|
| Business Planning | 30 | 14 | 9 | 5 | 3 |
| Strategic management | 18 | 3 | 11 | 3 | 4 |
| Change management | 0 | 0 | 10 | 1 | 5 |
| General management | 1 | 0 | 2 | 0 | 0 |
| People Management | 9 | 3 | 11 | 4 | 1 |
| Financial Management | 26 | 19 | 26 | 7 | 2 |
| R&D | 4 | 2 | 8 | 12 | 6 |
| Knowledge management | 0 | 0 | 0 | 1 | 0 |
| Information systems | 0 | 0 | 1 | 0 | 0 |
| Legal Issues | 12 | 4 | 1 | 1 | 1 |
| Networking | 4 | 0 | 16 | 4 | 0 |
| Politics | 1 | 1 | 0 | 0 | 0 |
| Risk Management | 7 | 0 | 1 | 1 | 0 |
| Quality Management | 2 | 1 | 5 | 0 | 0 |
| Marketing | 24 | 12 | 31 | 9 | 5 |
| Sales | 0 | 0 | 5 | 1 | 0 |
| Operations Management | 16 | 2 | 36 | 3 | 5 |
| Logistics | 0 | 0 | 4 | 1 | 0 |
| Purchasing | 1 | 0 | 1 | 0 | 0 |
| Others | 0 | 1 | 1 | 0 | 0 |

Using the Friedman (Mendenhall, et al. 1976) test the following results can be presented:

**Table 23** Descriptive statistics of the data

| Stage | N | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| Idea | 20 | 7,75 | 9,851 | 0 | 30 |
| Start | 20 | 3,10 | 5,399 | 0 | 19 |
| Growth | 20 | 8,95 | 10,635 | 0 | 36 |
| Maturity | 20 | 2,65 | 3,360 | 0 | 12 |
| Decline | 20 | 1,60 | 2,186 | 0 | 6 |

**Table 24**  Ranks on the Friedman test

| Stage | Mean Rank |
|---|---|
| Idea | 3,58 |
| Start | 2,45 |
| Growth | 4,23 |
| Maturity | 2,73 |
| Decline | 2,03 |

**Table 25**  Statistics of the Friedman test

| Items | Value |
|---|---|
| N | 20 |
| Chi-Square | 29,654 |
| df | 4 |
| Asymp. Sig | 0,000 |

The result shows that there are at least 2 states that are statistically different in the cited external knowledge at the significant level 0.05 (P-value = 0.000 > $\alpha$ = 0.05) like presented in the Table 26.

**Table 26**  Wilcoxon signed ranks test statistics

| | Z | Asymp. Sig. |
|---|---|---|
| Start / Idea | -3,147[a] | 0,002 |
| Growth / Idea | -1,019[b] | 0,308 |
| Maturity / Idea | -2,362[a] | 0,018 |
| Decline / Idea | -2,758[a] | 0,006 |
| Growth / Start | -2,944[b] | 0,003 |
| Maturity / Start | -0,080[a] | 0,936 |
| Decline / Start | -1,024[a] | 0,306 |
| Maturity / Growth | -3,130[a] | 0,002 |
| Decline / Growth | -3,629[a] | 0,000 |
| Decline / Maturity | - 1,831[a] | 0,067 |

[a] based on positive ranks ;  [b] based on negative ranks

From the result it can be seen that there are 6 pairs of states that differ for the cited external knowledge namely Start – Idea, Maturity – Idea, Decline – Idea, Growth – Start, Maturity – Growth, and Decline – Growth. There are 4 pairs of states that are not different in the cited external knowledge, namely Growth – Idea, Maturity – Start, Decline – Start and Decline Maturity.

The result also shows that there are two different groups of state. The one group consists of the stages of the Idea and the Growth the other consisting of the Start, the Maturity and the Decline stages. One could argue that the first group represents stages which are not so systematic and not so easy to plan having some elements of chaos in times. Whereas the other group consists of stages which are more systematic by nature.

Without going in to the detail in general it can be assumed that the knowledge areas that are important to SME's do change through the life cycle of the business (or through the life cycle of product and technology). At the idea stage the three most important areas of expertise are the

1. Business Planning - a total of 30 times (19,4 %)
2. Financial Management - 26 times (16,8 %)
3. Marketing - 24 times (15,5 %)

The Business Planning in the Idea stages is according to the survey about 'What is the business in general?'. There are questions like 'How people act in various business situations?', 'What would be the business logic i.e. how to make money?' and 'How to know oneself i.e. what are my weaknesses and strengths related to the intended business'? The Financial Management in the Idea stages is according to the survey about 'How to obtain the initial funding?', 'Who would be the right funding partners' and 'What funding instruments there would be for me to use?' The Marketing in the Idea stages is according to the survey about 'What would be best markets to address first?', 'How to build a customer focus from the very beginning?' and 'Are the some regulations, that the company has to take into account when

starting the business?'. A more complete picture of the Idea stage is presented in Figure 17 as well as in Appendices C and D.
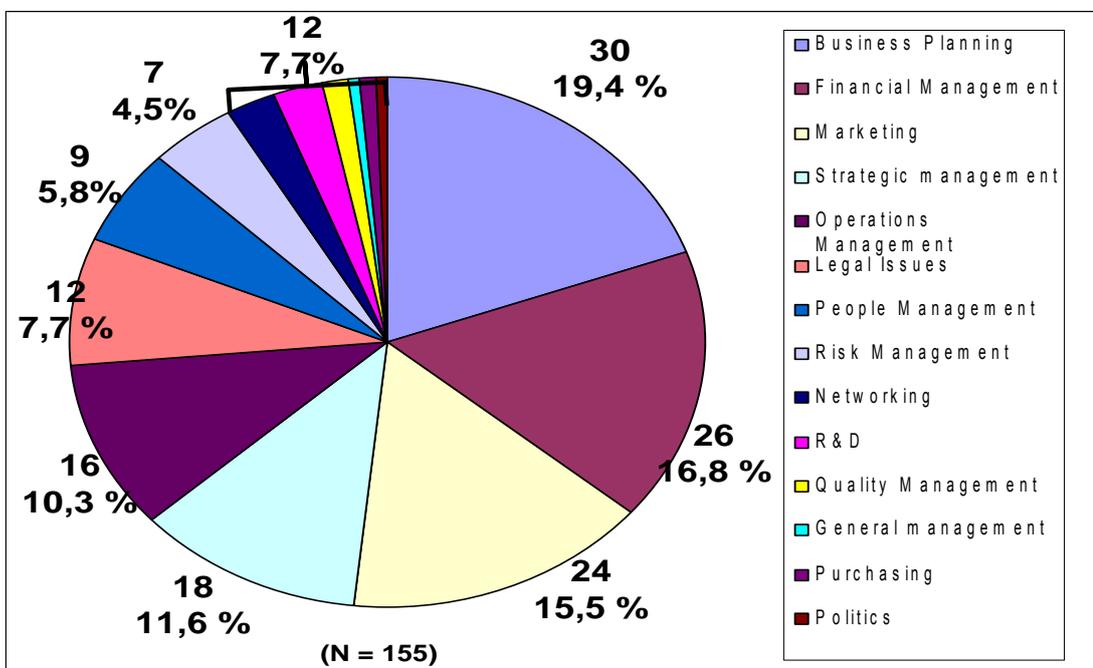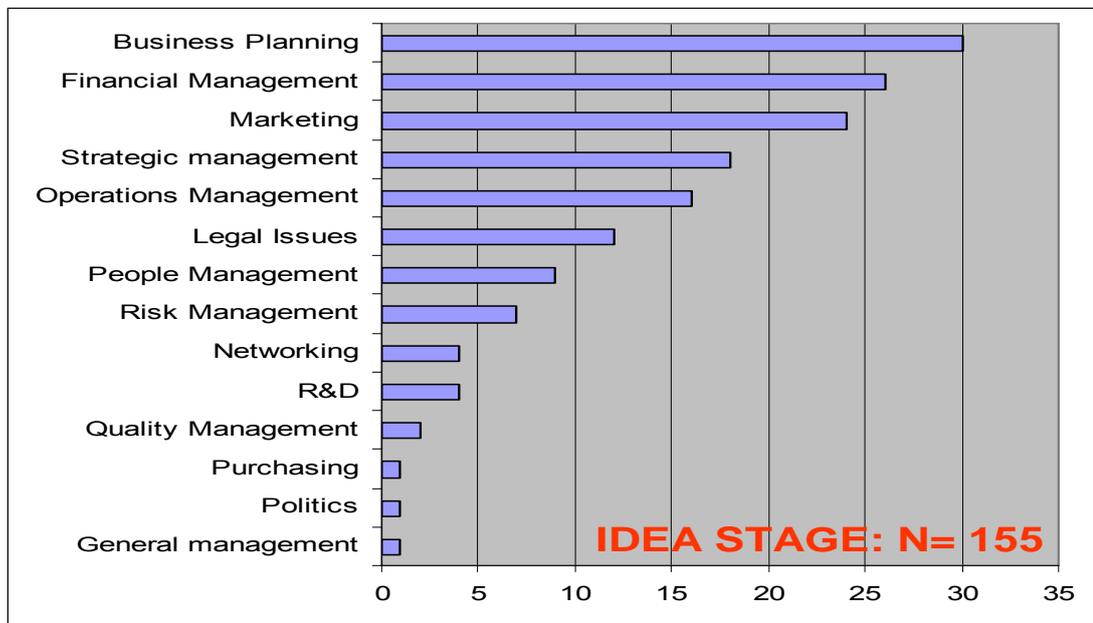




**Figure 17** External expertise used at the Idea stage

At the Start-up stage the importance of the Business Planning has become somewhat less important and the Financial Management has become the most important area of expertise. The three most important areas of expertise are the

1. Financial Management  - a total of 19 times (30,6 %)
2. Business Planning  - 14 times  (22,6 %)
3. Marketing - 12 times (19,4 %)

The Financial Management in the Start-up stages is according to the survey about 'What is the right combination of funding between own money, bank loans and venture funding?', 'How to negitiate with the potential Venture Capitalists?' and 'Are there still some other funding possibilities?'

The Business Planning in the Start-up stages is according to the survey about 'Are there alternative ways on doing business?',  'What are  the different stages in doing business and especially how to face the "death vally"?', 'What  management skills the entrepreneur needs to run the business'?, 'How to utilize the strategic management methods and tools (SWOT)?' and 'How to plan for growth?'

The Marketing in the Start-up stages is according to the survey about 'How to manage the market entry?', 'How to define the market positioning?' and the very important question 'How to make sales?'

A more complete picture of the Start-up stage is presented in Figure 18 as well as in Appendices C and D.
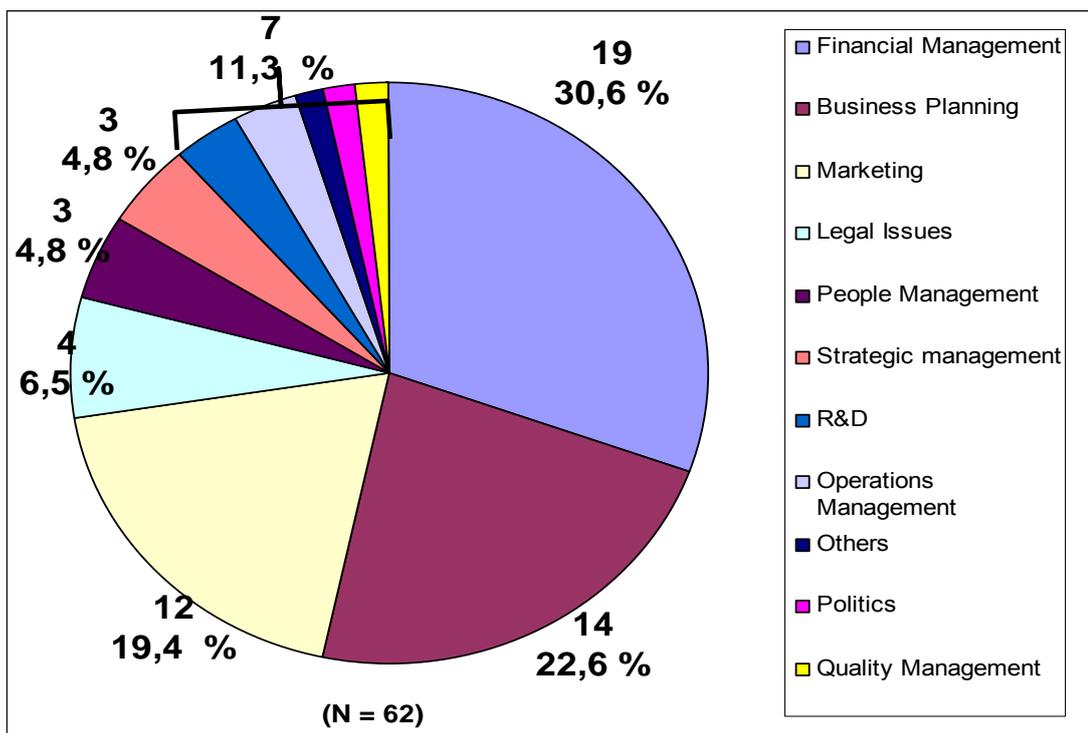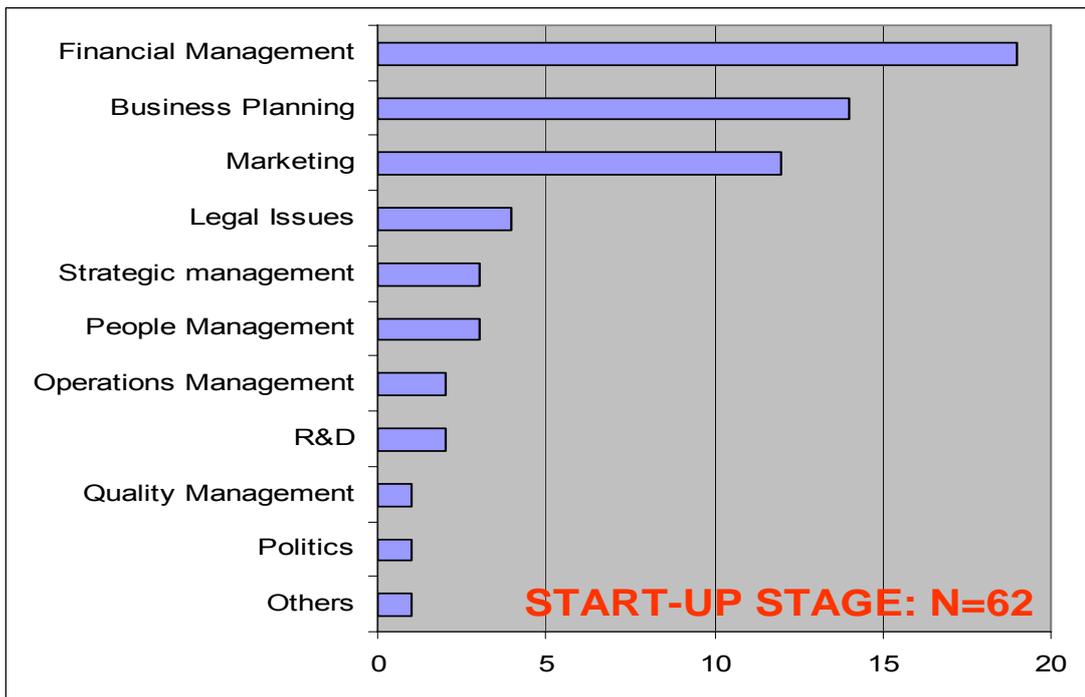
**Figure 18** External expertise used at the Start-up stage

At the Growth stage the importance of the Operations Management has become most important and the three most important areas of expertise are the

1. Operations Management - a total of 36 times (20,1 %)
2. Marketing - 31 times (17,3 %)
3. Financial Management - 26 times (14,5 %)

The Operations Management in the Growth stages is according to the survey about 'How to manage the quality?, 'How to ramp-up the production?, 'How to organize the supply chain?' and 'How to guarantee profitability?'

The Marketing in the Growth stages is according to the survey about 'How to manage the customer relationships?', 'What is the marketing strategy?' and still here the very important question 'How to guarantee the good sales?'

The Financial Management in the Growth stages is according to the survey about 'How to perform good cost accounting?',  'When the IPO is possible?, 'How to manage the V.C. ?' and 'How to control costs from the growth?'

A more complete picture of the Growth stage is presented in Figure 19 as well as in Appendices C and D.
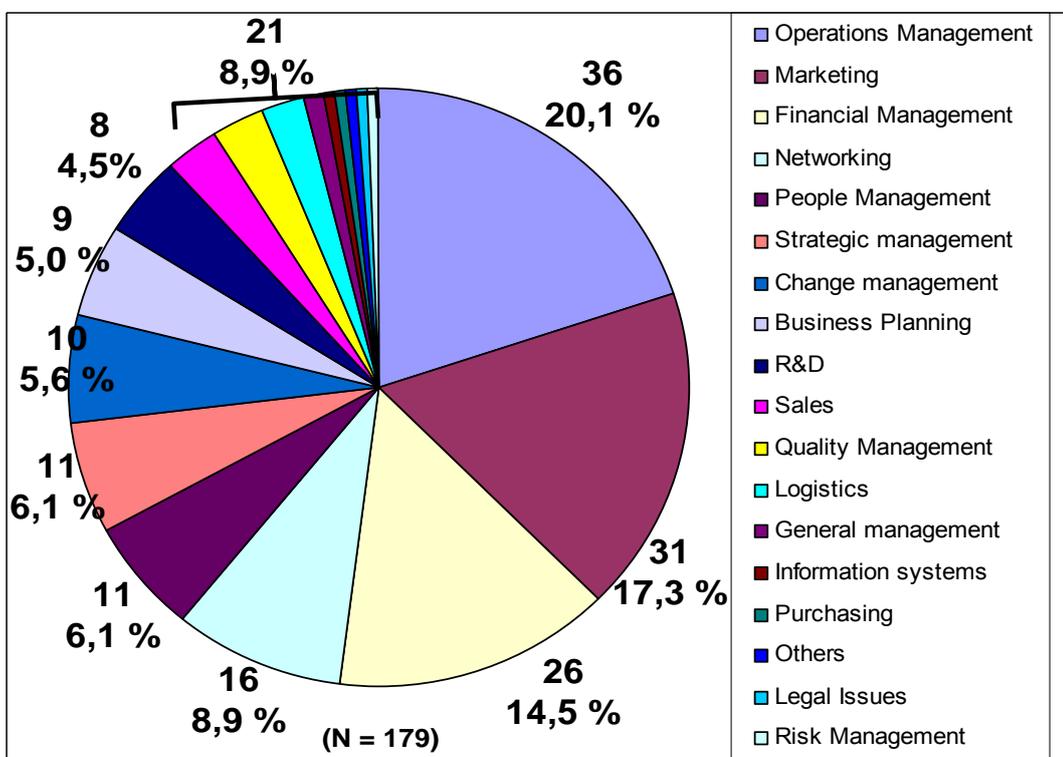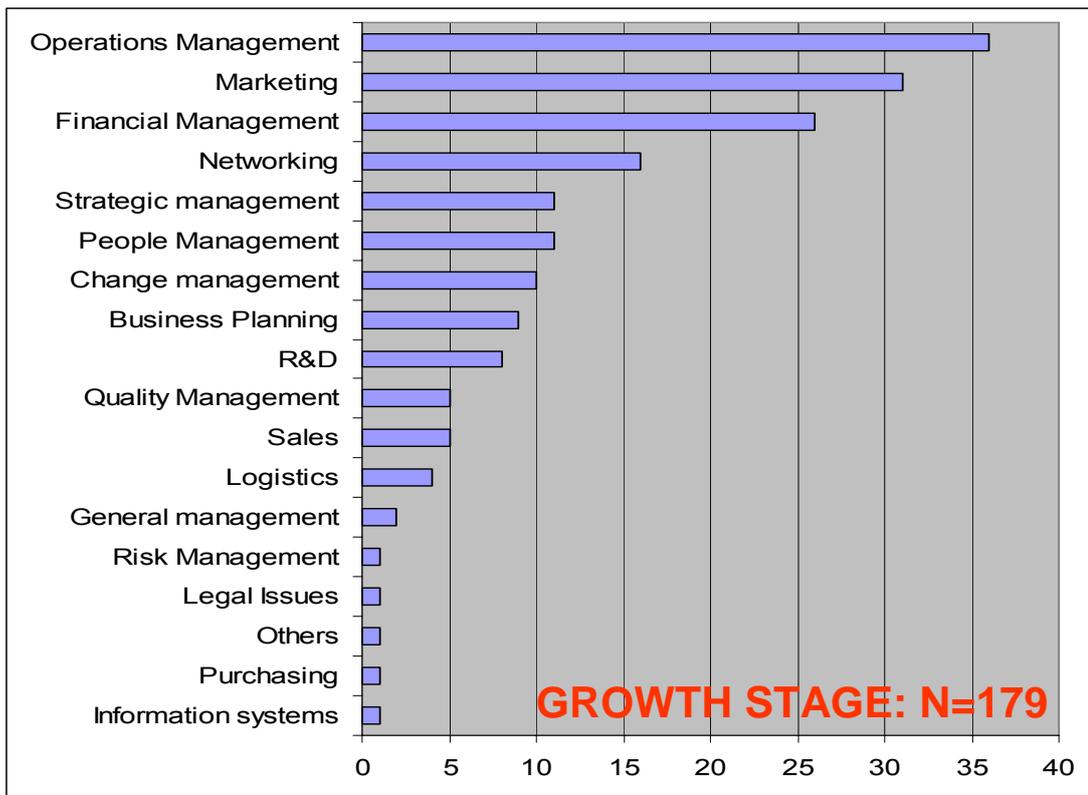
**Figure 19** External expertise used at the Growth stage

At the Mature stage the importance of  the Research and Development (R&D), especially the product development has become most important area of expertise and the three most important areas of expertise are the

1.  R & D - a total of 36 times (22,6 %)
2.  Marketing - 31 times – (17,0 %)
3.  Financial Management - 26 times (13,2 %)

The Research and Development (R&D) in the Mature stages is according to the survey about the technologies and technology strategies, 'How to manage the IPR's?' and 'How to read the signals from the markets?

The Marketing in the Mature stages is according to the survey about 'How to market in a tough competition?'

The Financial Management in the Mature stages is according to the survey about  'When the IPO is possible?, 'What funding alternatives does the company have?' and 'How much money can be invested into the new ventures?'

A complete picture of the Mature stage is presented in Figure 20 as well as in Appendices C and D.
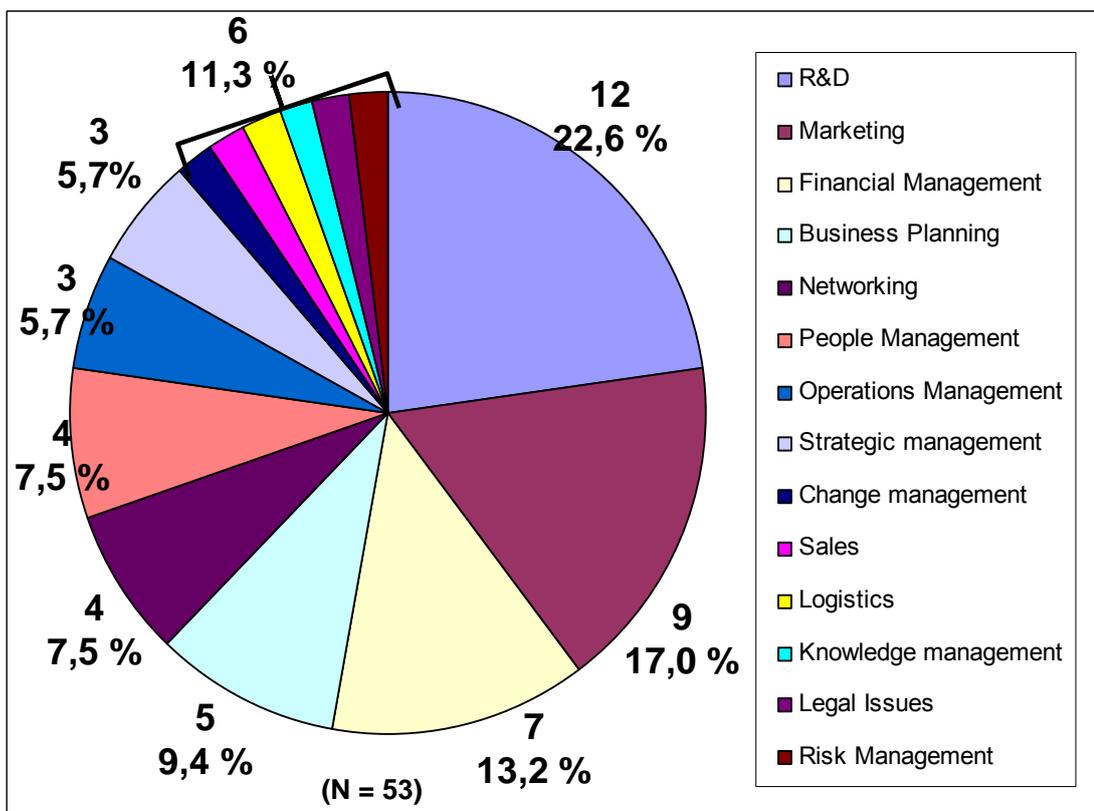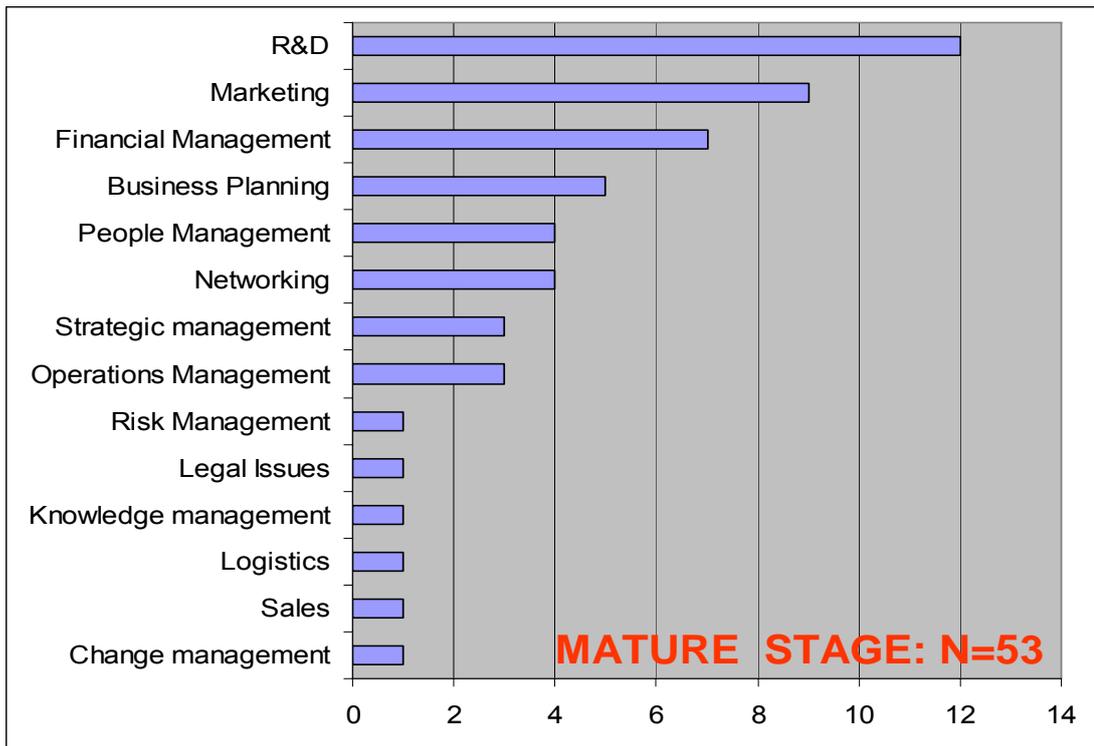
**Figure 20** External expertise used at the Mature stage

At the stage where the business starts to decline or the company decides to do something the renew the business the importance of the R&D continues to be of high importance. The four most important areas of expertise are the

1. Research and Development  - a total of 6 times (18,8 %)
2. Marketing – 5 time (15,6 %)
3. Operations Management – 5 time (15,6 %)
4. Strategic Management – 5 time (15,6 %)

The Research and Development (R&D) in the stage when the business starts to decline according to the survey is the technology analysis.

The Marketing in the Declining stage is according to the survey about 'What the market analysis can tell to the company?', 'What are really the customer needs?' and  'How to utilize the CRM in the best possible ways?

The operations management deal with questions like 'How to cut the costs?' and 'What are the core processes of the company?'.  The strategic management at the declining stages looks answers to questions about reorganizing the whole business, about change management and about complete business analysis.

A complete picture of the last stage in primary life-cycle is presented in Figure 21 as well as in Appendices C and D.
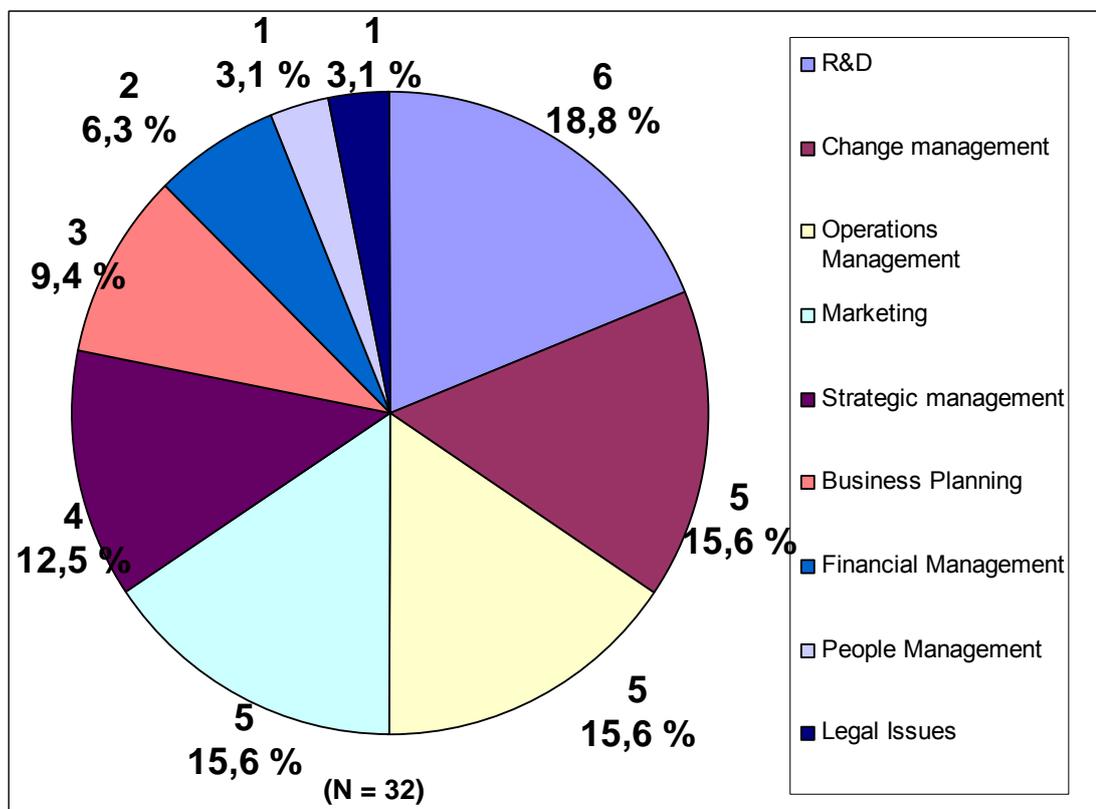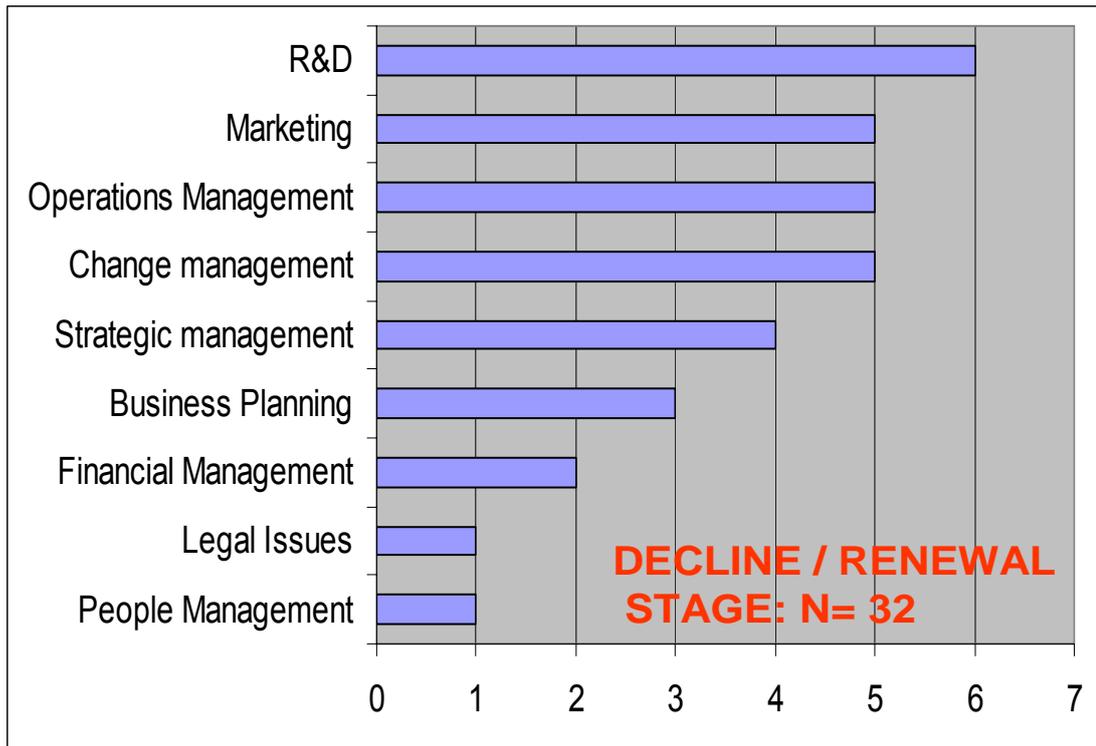
**Figure 21** External expertise used at the Decline and Renewal stage

When analyzing the changes (see Figure 22) of the usage and the need of external knowledge very interesting results can be identified.  To highlight some findings the following can be found:

- Business Planning is very important in the idea phase and its importance gets smaller and smaller through the whole life cycle of the company, even at the renewal phase business planning has not been seen as important area
- Operations becomes very important area in the growth stage, which is understandable and is in line with contemporary management
- Marketing and Financial management are important areas of external expertise nearly through-out the life cycle.
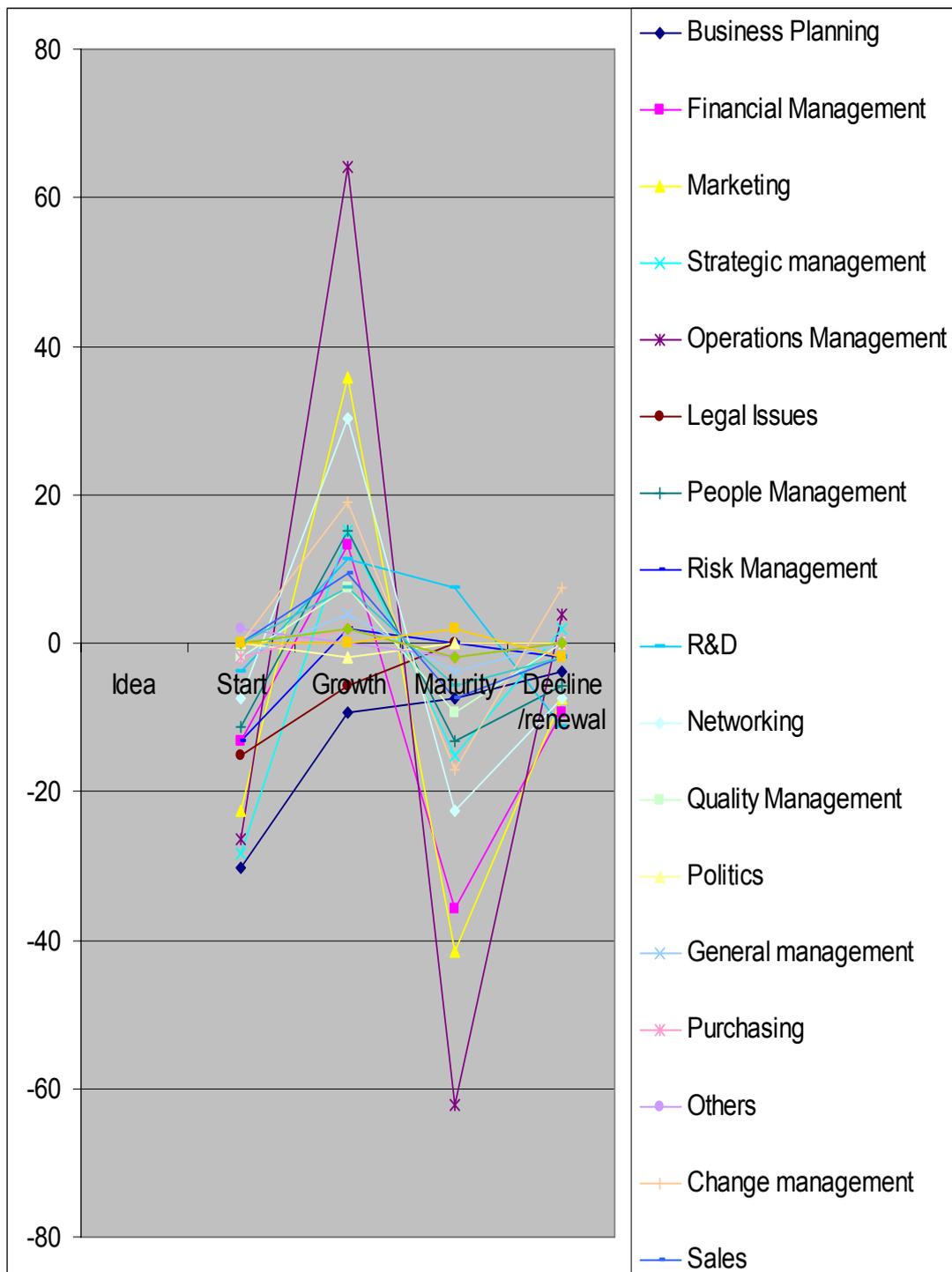
**Figure 22** Changes in the roles of the external experts from stage to stage

Expert Interviews

## Introduction

One of the most important sources of case study information is the interview. The interview is the main road to multiple realities (Stake, 1995). Interviews, which may be open-ended, focused or in the form of survey (Yin, 1994).

Case study interviews are of an open-ended nature, in which you can ask key respondents for the facts of a matter as well as for the respondents' opinions about events. In some situations, you may even ask the respondent to propose his or her own insights into certain occurrences and may use such propositions as the basis for further inquiry. Key informants are often critical to the success of a case study.

A focused interview is one of in which the informant is interviewed for a short period of time, for example an hour. Although such an interview will frequently be reasonably open-ended and informal in manner, the researcher will be following an interview schedule or set of questions.

A third type of interview entails more structured questions, along the lines of a formal survey. Such a survey could be designed as part of a case study. This type of survey would involve both the sampling procedures and instruments used in regular surveys, and it would subsequently be analyzed in a similar manner.

Interviews are an essential source of case study. However, they are verbal reports only and as subject to the problems of bias as well as poor recall, and poor or inaccurate articulation. A reasonable approach is to corroborate interview data with information from other sources.

## Interviewees

The interviewees (Table 27) were selected based on the following aspects:

- long expertise in sharing knowledge with entrepreneurs

- known strong views on the differences and similarities between entrepreneurs in Finland and in the US

- Ease of access

- A trust at least on a reasonable level between the interviewer and the interviewees.

**Table 27** Interviewees of the study

| Name | Affiliation | Date | Interviewer | Duration (hrs) |
|---|---|---|---|---|
| 1. WP | PAV Associates, San Diego, California, USA | 18.03.04 | P. Kess | 5 |
| 2. PP | MCON, Oulu, Finland | 5.11.04 | P. Kess | 0.5 |
| 3. MK | MCON, Oulu, Finland | 5.11.04 | P. Kess | 1.5 |
| 4. PR | Upstream Engineering, Inc, Le Chatelet, Switzerland | 18.11.04 | P. Kess | 2 |
| 5. BF | Consultant, Director GSW team, San Jose, CA, USA | 18.11.04 | P. Kess | 1 |
| 6. VV | Consultant, Director GSW team, San Jose, CA, USA | 18.11.04 | P. Kess | 2 |
| 7. JS | Entrepreneur, San Diego, CA, USA | 25.3.05 | P. Kess | 1 |

**Interview schemas**

All experts were approached with two basic open ended questions:

- How do you understand the concept company external knowledge?

- How companies could benefit from using external knowledge?

The interviewees were given very free hands to approach the question of external expertise. The same life-cycle approach that was used in the survey was not explicitly utilized here. However the interviews included in addition to the original questions a broad elaboration of helping SMEs to perform better in (international) business.

**Summary of Interview**

The results of these interviews are presented in the Appendix E. As summary the following findings can be listed:

1. Market understanding is a key issue in business success
2. Networking is an important method to access external knowledge
3. The attitude of the entrepreneur (manager of a SME) is important when it comes to using external experts – the chemistry between the knowledge owner and knowledge seeker must work
4. One should utilize all external knowledge that is available – there is never too much.

Literature enhancement

The research was extended from Finland and the USA to Thailand after the initial start of the research work. The researcher had a pre-understanding of the SME business cultures in the first two first mentioned countries but the understanding of the Thai business in general and the business of the SME's especially was close to non existent. In order to better understand the business and also the results from the surveys and interviews a literature survey was made to the Thai business. The insights of the Thai business from Backman (2006), Cooper (2004), Holmes and Tangtongtavy (2003) and Tomizawa (2005) helped to understand better the business life in Thailand. These gave strong support to the needs to include the family culture in to the framework of company external knowledge.

Summary of the survey, the interviews and the literature

To sum up the results of the surveys and the interviews of the expertise in addition to the literature the areas of external knowledge are structured into the main categories which were found to be:

- The Mentor, who typically has a long and extensive experience of successful business and is willing to share his/her knowledge with younger and less experienced entrepreneurs and managers.

- The Coach, who is a professional with expertise especially in business processes and in their improvement and development.

- The Angel has some financial resources or at least knows where to get these resources for the company. The Angel also knows how to utilize the financial resources that are already within the company.

- The Guru, who has very deep understanding and has very professional knowledge of some specific area of expertise,. This expertise can be used to products, production, marketing or any other processes of the company.

- The Politician, who has knowledge about local, national and even international politics that is relevant to the business operations.

- The Father, who represents the historical background of the family business. In this role the knowledge is strongly combined with the shared family values.

These roles of external knowledge can not be put into any order of importance based on this research. This research did not make any attempt to draw causal relations between the usage of external knowledge and the success (or the failure) of the business with SMEs.

The areas of expertise can be allocated to the main categories of experts. Some overlap can be identified.  Based on the research i.e.

1.  The surveys – how the respondents list the various bits of knowledge SME's can obtain from external sources (Appendix C)

2.  The creation of the taxonomy from the literature, the surveys and the interviews.

3.  Inductive reasoning of the researcher.

An overall picture can be drawn where the areas of expertise are allocated to the main categories of the experts.   Here a scale is used indicating how central an

area of expertise is or how marginal it might be. The scale is debatable because these phenomena have not been empirically tested in this research. Here 'strong' means that according to the taxonomy the presented area of expertise belongs definitely to the main category of the taxonomy. For instance in the first line the expertise area of Marketing belongs strongly to the categories of Coach and Guru.

The next in the scale is 'moderate' meaning that according to the taxonomy the presented area of expertise belongs to some extent to the main category of the taxonomy. For instance in the second line the expertise area of Financial Management belongs moderately to the categories of Mentor, Coach and Guru.

The next in the scale is 'weak' meaning that according to the taxonomy the presented area of expertise belongs only weakly to the main category of the taxonomy. For instance in the first line the expertise area of Marketing belongs weakly to the category of Mentor.

The last (or lowest /weakest) in the scale is 'not-applicable or un-substantial' meaning that according to the taxonomy the presented area of expertise has no real meaning to the main category of the taxonomy. For instance in the first line the expertise area of Marketing is not connected to the areas of expertise of the Angel.

The complete analysis is presented as in Figure 23.

A similar analysis is made on the knowledge transfer between the expert and the SME. The analysis is again based on the research i.e.

1.  The surveys – how the respondents list the various bits of knowledge SME's can obtain from external sources (Appendix C)

2.  The creation of the taxonomy from the literature, the surveys and the interviews.

3.  Inductive reasoning of the researcher.

An overall picture can be drawn where the knowledge transfer related to the main categories of the experts is assessed. Here similar scale is used to indicate how applicable a certain transfer method might or might not be.

The scale is debatable because these phenomena have not been empirically tested in this research. Here 'strong' means that according to the transfer method is very applicable in that main category of the taxonomy. For instance in the first line all categories are indicated as applicable to use "informal – in person" way of knowledge transfer.

The next in the scale is 'moderate' meaning that the way of knowledge transfer is applicable to the main category of the taxonomy. For instance in the third line the categories of Coach, Guru and Angel indicate the usage of training as moderately applicable.

The next in the scale is 'weak' meaning that the way of knowledge transfer is just weakly applicable to the main category of the taxonomy. For instance in the second line the category of Mentor indicates the usage of 'formal and in-person' as weakly applicable.

The last (or lowest /weakest) in the scale is 'not-applicable or un-substantial' meaning that the way of knowledge transfer is basically not applicable to the main category of the taxonomy. For instance in the fifth line the category of Mentor indicates the usage of 'knowledge-base' as not-applicable.

The complete analysis is presented as in Figure 24.

| | Mentor | Coach | Guru | Angel | Politician | Father |
|---|---|---|---|---|---|---|
| Marketing | Weak | Strong | Strong | Not Applicable | Not Applicable | Not Applicable |
| Financial Management | Moderate | Moderate | Moderate | Strong | Weak | Not Applicable |
| Operations Management | Not Applicable | Strong | Strong | Not Applicable | Not Applicable | Not Applicable |
| Business Planning | Strong | Strong | Weak | Weak | Not Applicable | Weak |
| Strategic Management | Strong | Strong | Not Applicable | Weak | Not Applicable | Weak |
| R&D | Moderate | Moderate | Strong | Not Applicable | Not Applicable | Not Applicable |
| People Management | Moderate | Strong | Weak | Not Applicable | Not Applicable | Moderate |
| Networking | Strong | Strong | Not Applicable | Weak | Strong | Strong |
| Legal Issues | Not Applicable | Weak | Moderate | Not Applicable | Not Applicable | Not Applicable |
| Change Management | Not Applicable | Strong | Not Applicable | Not Applicable | Not Applicable | Not Applicable |
| Risk Management | Not Applicable | Moderate | Weak | Weak | Not Applicable | Not Applicable |
| Quality Management | Not Applicable | Strong | Weak | Not Applicable | Not Applicable | Not Applicable |
| Sales | Not Applicable | Moderate | Strong | Not Applicable | Not Applicable | Not Applicable |
| Logistics | Not Applicable | Moderate | Strong | Not Applicable | Not Applicable | Not Applicable |
| General Management | Moderate | Strong | Not Applicable | Not Applicable | Not Applicable | Weak |
| Purchasing | Not Applicable | Moderate | Strong | Not Applicable | Not Applicable | Not Applicable |
| Politics | Moderate | Weak | Not Applicable | Weak | Strong | Weak |
| Knowledge Management | Not Applicable | Strong | Weak | Not Applicable | Not Applicable | Not Applicable |
| Information systems | Not Applicable | Weak | Strong | Not Applicable | Not Applicable | Not Applicable |

| Not Applicable / Un-substantial | Weak | Moderate | Strong |
|---|---|---|---|
| (red) | (olive) | (blue) | (green) |

**Figure 23** Knowledge areas in relation to the knowledge owner roles

| | Mentor | Coach | Guru | Angel | Politician | Father |
|---|---|---|---|---|---|---|
| **In person – informal** | | | | | | |
| **In person – formal** | | | | | | |
| **Training** | | | | | | |
| **Documents** | | | | | | |
| **Knowledge bases** | | | | | | |

| Not Applicable / Un-substantial | Weak | Moderate | Strong |
|---|---|---|---|
| | | | |

**Figure 24** Knowledge transfer and the knowledge owners

The knowledge transfer between the knowledge owner and the knowledge seeker depends also on the quality of the knowledge in the spectrum of explicit – tacit (Nonaka and Takeuchi 1995).

Based on the survey (Appendices C & D) an analysis can be made regarding the tacitness or explicitness of the knowledge represented by the knowledge owners as in Figure 25. Here the presentation is based on the inductive reasoning by the researcher.
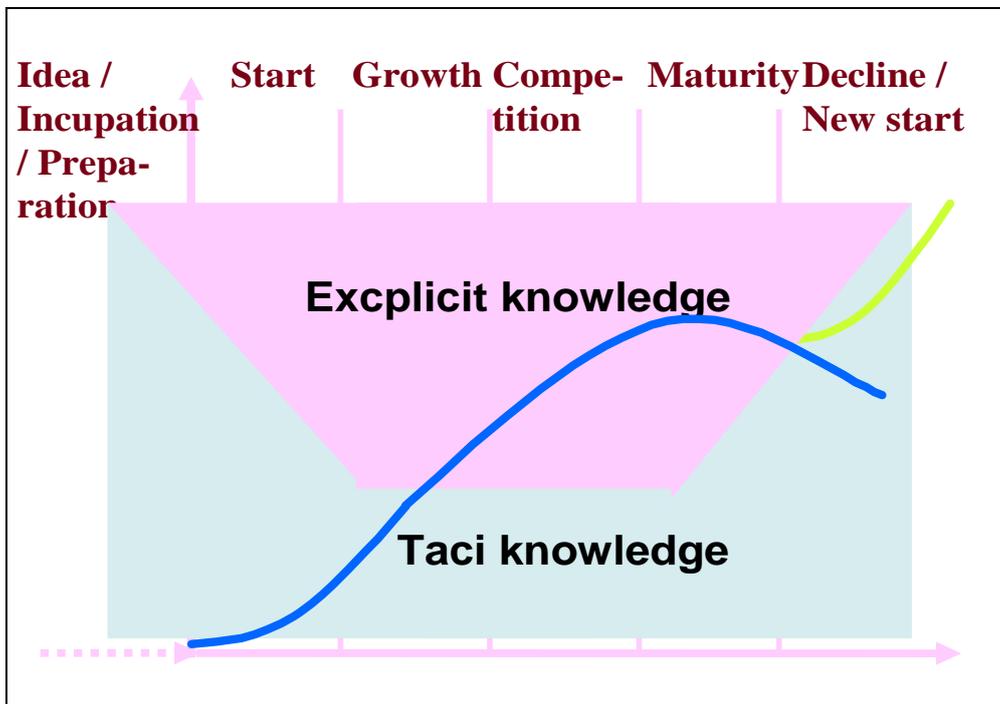
**Figure 25**  Tacit and explicit external knowledge along the life cycles.

**The Taxonomy of the Company External Knowledge**

Below in the Figures 26-31 the taxonomy is presented in the three abstraction levels defined in this research. The taxonomy defines the various roles and their knowledge spectrum as well as some indicators.  At the highest levels the taxonomy has the roles of:

- The Mentor
- The Coach
- The Angel
- The Guru
- The Politician
- The Father

| MENTOR |
|---|
| **Business knowledge** |
| Knowledge on business practices in geographical, cultural, etc. areas |
| Entrepreneurship |
| **Strategic thinking** |
| Holistic view on business |
| Target setting |
| Business logic: How to make money |
| Different / innovative ways of doing business |
| **Interpersonal skills** |
| Behavior in various business settings |
| Capability to analyze values and attitudes |
| **Personal skills** |
| Self knowledge : strengths and weaknesses |
| Problems recognition skills |
| **Business Planning** |
| Business analysis |
| Business idea |
| Product |
| Competitive advantage |
| Market |
| Customer focus |
| Competition |
| Marketing |
| Operations planning |
| Management |
| Financial resources |
| Operations control system |
| **Risk management** |
| Risk assessment |
| Risk analysis |
| Risk reduction |
| **Partnerships** |
| Partnership building |
| Trust building |
| **Networking** |
| Network building |
| Trust building |

**Figure 26** The Knowledge Areas of the Mentor

| COACH |
|---|
| **Process Knowledge** |
| Process measurement |
| Process Improvement |
| Process re-engineering |
| **Change Management** |
| Analysis |
| Change planning |
| Change implementation |
| **Management processes and practices** |
| Management system development (P-CMM) |
| Strategy process (SWOT analysis, Scenario work) |
| **Total Quality Management (TQM) development** |
| Quality analysis |
| Methods (ISO 9000, EQA, MBNA, CMM-I, etc) |
| **Product** |
| Product analysis |
| Methods (QFD, value analysis, etc) |
| **Production** |
| Production analysis |
| Methods (productivity, yield improvement, etc) |
| Operations management system development |
| Methods (JIT, Kanban, TOC, ERP, etc) |
| **Marketing** |
| Marketing mix - 4P (Product, Price, Promotion and Place) analysis |
| 4P development |
| Distribution planning (local, domestic, export, international) |
| **Human Resources Management (HRM)** |
| Recruiting process development |
| Recruiting process development |
| Safety at work development (OSHA) |
| **Outsourcing** |
| Partner analysis |
| Process analysis |
| Outsourcing realization |

**Figure 27** The Knowledge Areas of the Coach

| ANGEL |
|---|
| Financial Analysis |
|     Profit and loss accounting |
|     Cost accounting (Activity Based Costing – ABC, etc) |
| Funding Sources |
|     Angel funding |
|     Venture Capital (VC) |
|     Initial Public Offering (IPO) |
|     Grants (local, national, international) |
|     Loans from Banks and other institutions |
|     Family funding |
|     Joint ventures |
| Funding process |
|     Business planning for funding purposes |
|     Negotiation skills |
| Portfolio analysis |

**Figure 28** The Knowledge Areas of the Angel

| GURU | | |
|---|---|---|
| Product | | |
| | Product features | |
| | Product structure | |
| | Product technologies | |
| | Product design – the artistic view | |
| Production | | |
| | Production technologies | |
| | Outsourcing possibilities | |
| Market | | |
| | Market size (segments, growth, etc) | |
| | Competitors | |
| | Market share development | |
| | Distribution channels | |
| Juridical knowledge | | |
| | Purchase agreements | |
| | Sales agreements | |
| | Distribution agreements (Agent, etc) | |
| | Partnership agreements | |
| | License agreements (buy and sell) | |
| | Intellectual Property Rights (IPR) management | |
| | Employment laws, bylaws and regulations (national / international) | |
| ICT | | |
| | Computer systems (HW, OS, SW) | |
| | Network | |
| | Software Systems (MRP, ERP, etc) | |
| | e-commerce solutions | |
| Human Resources Management | | |
| | Recruiting practices and tools | |
| | Union relations | |
| | Employment practices (local/national/international) | |
| Business Culture | | |
| | National / regional business cultures (cultural differences) | |
| | Spiritual matters affecting business | |

**Figure 29** The Knowledge Areas of the Guru

| POLITICIAN | | |
|---|---|---|
| | Knowledge on local political influences on business practices | |
| | | Public support to the businesses |
| | | Political networks |
| | Knowledge regional  political influences on business practices | |
| | | Public support to the businesses |
| | | Political networks |
| | Knowledge national  political influences on business practices | |
| | | Public support to the businesses |
| | | Political networks |
| | Knowledge international (EU etc.)  political influences on business practices | |
| | | Public support to the businesses |
| | | Political networks |
| HRM | | |
| | Labor union policy | |

**Figure 30** The Knowledge Areas of the Politician

| FATHER | | |
|---|---|---|
| | Knowledge on the family | |
| | | Family business history |
| | | Family traditions |
| | | Family expectations |
| | | Family values and norms |
| | Knowledge on the family members | |
| | | Knowledge of the strengths and the weaknesses of the family members in the business |
| | Funding | |
| | | Family funding practices in the business |

**Figure 31** The Knowledge Areas of the Father

**The Quality Assurance of the research**

Validity

The test of the validity of the research is also test of the truthfulness of the research.  The question basically is about how close to the truth the research can be assumed to be.  The research gap was described with the research questions:

1. What types of classifications have been used in knowledge transfer?
2.  What is the company external knowledge taxonomy that can be used to study external knowledge usage to the benefits of SME's?

In this respect it is necessary to evaluate how much truthfully this gap has been covered with this research.

From the constructive research approach point of view the validation of a solution should be done by the market tests:

• A weak market test:  the taxonomy as such is not so much meant for managers but for scientists. The purpose of the taxonomy was to help the further studies in knowledge transfer to SME's from external knowledge sources. The idea has been presented in scientific community and the taxonomy has been tested in a small scale survey with 20 companies.
• Semi − strong market test will follow with further studies.
• Strong market test when the construction will provide benefits to the SME research will follow later.

The validity of the research will be assessed based on the method by Johnson (1997). The result of the assessment is described in the Table 28.

**Table 28** Strategies used to promote qualitative research validity

| Role of the researcher | General description | Used in this research |
|---|---|---|
| Researcher as "Detective" | A metaphor characterizing the qualitative researcher as he searches for evidence about causes and effects. The researcher develops an understanding of the data through careful consideration of potential causes and effects and by systematically eliminating "rival" explanations or hypotheses until the final "case" is made "beyond a reasonable doubt." | • Extensive literature search<br>• Rich participation in the survey in Finland<br>• Enrichment of the informants from Thailand and the US |
| Extended fieldwork | When possible, qualitative researchers should collect data in the field over an extended period of time. | • Data collection from the very first to the very last has taken about 3 years. |
| Low inference descriptors | The use of description phrased very close to the participants' accounts and researchers' field notes. Verbatim (i.e., direct quotation) is a commonly used type of low inference descriptor. | • Both structured and unstructured approaches have been used. |

**Table 28** (Continued)

| Role of the researcher | General description | Used in this research |
|---|---|---|
| Triangulation | "Cross-checking" information and conclusions through the use of multiple procedures of sources. When the different procedures or sources are in agreement you have "corroboration." | • Several points of view have been used to triangulate the phenomenon of the company external knowledge. |
| Data triangulation | The use of multiple data sources to help understand a phenomenon. | A total of 49 people were surveyed, 8 interviewed and 4 otherwise data collected. Majority were from Finland but also experts from Thailand the US were used. |
| Methods triangulation | The use of multiple research methods to study a phenomenon. | 1. Literature review<br>2. Survey<br>3. Interviews<br>were used |
| Investigator triangulation | The use of multiple investigators (i.e., multiple researchers) in collecting and interpreting the data. | Professor Phusavat helped in collecting the data from Thailand. |

**Table 28**  (Continued)

| Role of the researcher | General description | Used in this research |
|---|---|---|
| Theory triangulation | The use of multiple theories and perspectives to help interpret and explain the data | Several knowledge classifications have been tested. These are included in this research report in chapter 'Classifications of knowledge' |
| Participant feedback | The feedback and discussion of the researcher's interpretations and conclusions with the actual participants and other members of the participant community for verification and insight. | The results have been tested with interviews of 20 'similar' people (16 in Finland and 4 in Thailand) |
| Negative case sampling | Locating and examining cases that disconfirm the researcher's expectations and tentative explanation. | Not found |
| Reflexivity | This involves self-awareness and "critical self-reflection" by the researcher on his or her potential biases and predispositions as these may affect the research process and conclusions. | Not done yet. This will included in the research were the taxonomy will be used. Probably the taxonomy will develop through these studies, which very common to many concepts, models and taxonomies. |

**Table 28**  (Continued)

| Role of the researcher | General description | Used in this research |
|---|---|---|
| Peer review | Discussion of the researcher's interpretations and conclusions with other people. This includes discussion with a "disinterested peer" (e.g., with another researcher not directly involved). This peer should be skeptical and play the "devil's advocate," challenging the researcher to provide solid evidence for any interpretations or conclusions. | The research ideas have been frequently discussed with professors Phusavat and Takala.<br><br>The ideas of knowledge management in general and the external knowledge especially as well as some results of the research have been (and will be) published in various forums: Kess, 1994; Kess and Haapasalo, 2001; Kess,  Phusavat and Takala, 2006; Kess,  Phusavat and Takala, 2007; Kess, Torkko and Phusavat  2007a; Kess, Torkko and Phusavat  2007b; Kess, Torkko and Phusavat, 2007c; Kess, Torkko and Phusavat, 2007d; Phusavat and Kess, 2007 |
| Pattern matching | Predicting a series of results that form a "pattern" and then determining the degree to which the actual results fit the predicted pattern. | The starting point to the research was the PathMaster classification. It has formed the basic "pattern" and has been expanded based on the empirical research and the literature enhancement |

Credibility

The credibility of the research is based on the quality (and the quantity) of the

- literature used
- research process used
- empirical data collected
- analysis method.

The literature used in this research covers the main journals in the area of management where Knowledge Management has been a research topic in the past years. During the research process a data base of some 500 documents (journal and conference articles, books, reports, memos, and web-sites) have been collected and analyzed from the external knowledge management points of view. Over 250 of these have been cited in this final research document.

The research process is based that of Carlile and Christensen (2005) as described in Figure 32 and it was designed to according to the process as described earlier in Figure 9. The process is described in this research document and the various phases can be followed from the document.
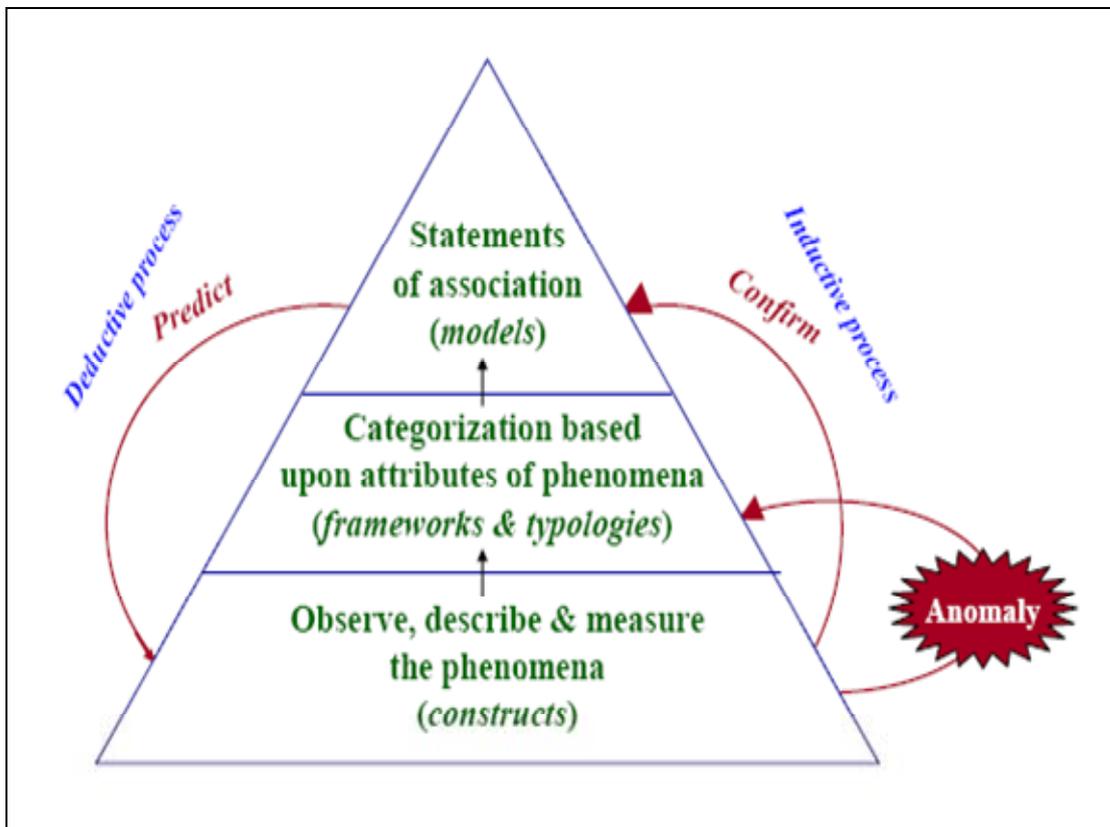
**Figure 32**  The process of building a theory
**Source**: Carlile and  Christensen (2005)


The primary empirical data was collected through the surveys. The groups of survey targets was selected based on the researchers previous knowledge of the industry as well of the knowledge agents and originations who help SME's in their rocky road too business success. The respondents volunteered to answer the lengthy questionnaire.  There are no reasons to assume any malpractice from that side but it cannot either be totally out ruled.


The data analysis was based on both inductive and deductive phases (Figure 31). The answers from the surveys were taken as they were written. In analyzing the interviews some interpretation by the researcher did happen.

In this work, being a qualitative by nature, the research is based on a limited amount of research data.  The reason for this is the limited time and resources. Here the starting point of the research was a well specified real problem situation, and the research environment was a real situation. This sets the also boundaries to the sample size.  However the limiting factors being only SME's and the external knowledge the number potential test cases is rather unlimited. As an example, it was reported in Finland that there are some 40,000 civil servants to aid companies (to supply some external knowledge) in addition to all KIBS companies from the private sector. All these are to help the 200,000 firms in Finland.

Predictability

Predictability is closely linked to information gathering and information analysis. Information gaps reduce predictability (Strauss and Corbin 1994): "if elsewhere approximately similar conditions obtain, then approximately similar consequences should occur". Here information gathering was planned to include experts from different sectors and representing different points of view in regards to the external knowledge with SME's. The aim was to fill the obvious and not so obvious information gabs. The basic assumption was that the gaps can be related to:

- knowledge provider – knowledge user
- various industries
- various countries
- business position in the life-cycle
- gender of the entrepreneur
- public – private knowledge provider
- young – old

The survey covered the spectrum from all these aspects except for the countries, where Finland was well presented and some supporting information was collected from the US and Thailand.

A theory explains how 'something' works and can predict how 'something' will behave under specific conditions. Theory development means formulating a consistent system of statements that unify, enlarge and deepen ideas, which had, before, been more or less intuitive and disconnected. This research has definitely developed the theory further where the former intuitive and disconnected elements have been put to uniform taxonomy.

Reliability

The reliability of the taxonomy was tested in two different ways. The first part was to interview and collect data from selected SME's about their usage of external knowledge and the benefits of doing so. The second part was two case studies of Finnish SME's where the usage of the external knowledge was examined in a greater detail and with a longer time period.

First it was selected 20 SMEs from Finland (16) and Thailand (4) in four industry groups. The selection of the industry groups was based on their significance in the business world in general. According to the latest data (Global 500, 2007) the sizes of the various business categories are as described in the Figure 33.
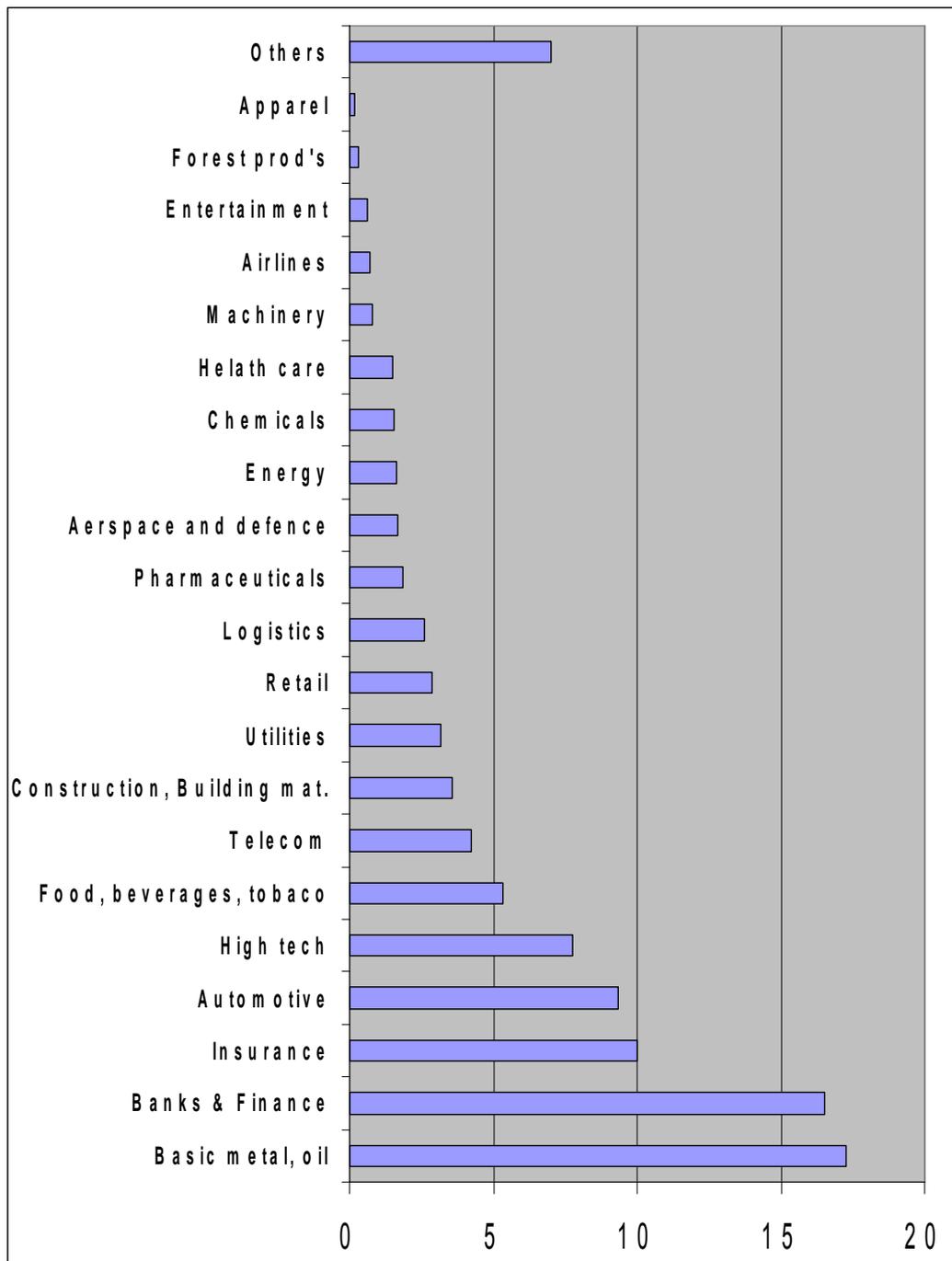
**Figure 33** Relative size of industries

**Source:** Global 500 (2007)

The combined services are definitely the largest business sector in total. High tech industry is one of the largest as well as is the 'food, beverage and tobacco'

category. Manufacturing – especially automobile is an important sector as well. In Thailand the machinery industry is 'one of the main push-factors for Thailand industrialization' (Executive Summary 2004). The Figure 32 describes how the 'big business' is distributed between industries. This research is about SME's, but it is also about how to grow from being a SME to become a large corporation with help from external knowledge sources. The companies (Table 29) are grouped into four business categories:

- services (1, 3, 6, 10, 17)
- high tech companies (2, 4, 5, 8, 9)
- food (12, 15, 16, 19, 20)
- manufacturing (7, 11, 13, 14, 18)

**Table 29**  Companies to test the taxonomy

|  | **Industry / Products** | **Location** | **Turnover (€'000)** | **# of workers** | **Foun-ded** |
|---|---|---|---|---|---|
| 1. | Training and Management Services | Oulu, Finland | 5 000 | 80 | 1981 |
| 2. | Electronics | Oulu, Finland | 1 000 | 15 | 1989 |
| 3. | Logistics services | Oulu, Finland | start-up business | 5 | 2005 |
| 4. | Bio Tech | Oulu, Finland | 3 | 100 | 1991 |
| 5. | Software | Kestila, Finland | 600 | 6 | 2000 |
| 6. | Assisting devices and related services | Helsinki, Finland | 21 000 | 210 | 2000 |
| 7. | Environmental equipment and systems | Raahe, Finland | start-up | 5 | 1997 |
| 8. | Control systems | Merijärvi, Finland | 1 000 | 7 | 1997 |

**Table 29**  (Continued)

| | Industry / Products | Location | Turnover (€'000) | # of workers | Foun-ded |
|---|---|---|---|---|---|
| 9. | IT for Music | Kestilä, Finland | start-up business | 2 | 2001 |
| 10. | Services in Lappish business | Kuusamo, Finland | 800 000 | 2 | 2005 |
| 11. | Industrial doors manufacturing and marketing | Nivala, Finland | 5 000 | 25 | 1977 |
| 12. | Food raw materials | Tyrnävä, Finland | 5 000 | 12 | 2002 |
| 13. | Machinery manufacturing | Oulu, Finland | 50 000 | 400(*) | 1990's |
| 14. | Mechanical wood manufacturing | Alavieska, Finland | 8 500 | 60 | 1994 |
| 15. | Restaurant | Oulu, Finland | 100 | 4 | 2002 |
| 16. | Fish products | Oulu, Finland | 11 000 | 45 | 1975 |
| 17. | HR consultant | Thailand | 200 | 10 | 2004 |
| 18. | Manufacturing | Thailand | 1 500 | 60 | 1992 |
| 19. | Food production | Thailand | 5 000 | 300 | 1990 |
| 20. | Frozen production | Thailand | 500 | 20 | 2005 |

(*) not SME by definition.

The results from these companies are presented company by company in Appendix F.

All together the companies indicated the usage of the external knowledge holders as defined by the taxonomy. The Figure 34 presents overall real and expected usage. What the figure shows is that:

- companies report usage of external knowledge in all phases of their life cycle.

- all categories of the developed taxonomy are utilized in close to all industries and in nearly all phases of the life cycle.

The figure however does not explain any differences between industries or stages, since the data collected was not meant to analyze that aspect of the taxonomy.



**Figure 34** The external knowledge use by various groups of companies.

The two cases that were used to analyze the model are described in appendix G.

The benefits from the usage of external knowledge by the companies in the validation survey and the case studies are as described in the Table 30.

**Table 30** Benefits from using external knowledge

| Life cycle stage of the business, technology, product line, product | External expert | Benefits |
| --- | --- | --- |
| **Idea** | Mentor | Business formation |
| | | Market potential utilization |
| | | Networking with a large company |
| | | Holistic business know-how |
| | | Spin-off's |
| | | Customer behavior in general |
| | | New strategies |
| | Coach | Strategic planning process |
| | | Business planning process |
| | Guru | New technologies |
| | | Product technologies |
| | | Production technologies |
| | | Testing technologies |
| | | Customer's processes |
| | Angel | Faster time-to-market |
| | | Good timing for start-up |
| | Politician | The make the business idea possible |
| | Father | Better people management |

**Table 30**  (Continued)

| Life cycle stage of the business, technology, product line, product | External expert | Benefits |
|---|---|---|
| **Start-up** | Mentor | Better business |
| | | Holistic business know-how |
| | | Mistakes avoidance |
| | | Critical to the start |
| | | Networking for: products, production, markets |
| | Coach | New markets |
| | | Production processes – technical quality assurance |
| | | Product development process improvement |
| | | Project management methods improvement |
| | Guru | Definition of the 'right products' for the business |
| | | Demand management issues |
| | | New products |
| | | Better products |
| | | Better product definition |
| | | Increase of sales |
| | | Better understanding of the markets |
| | | Entering into new markets |
| | | Focus on core competencies |
| | | Building expertise to the company |
| | | New technologies |
| | | Technology base building |
| | | Better partnership |

**Table 30**  (Continued)

| Life cycle stage of the business, technology, product line, product | External expert | Benefits |
|---|---|---|
| | Angel | Growth |
| | | Fast new product development (NDP) |
| | | Faster time-to-market |
| | | Realistic ramp-up |
| | | Better product with more features |
| | | Technology acquisition |
| | | Aid in survival |
| | | Bankruptcy avoidance |
| | | Directions o product development |
| | | Financial management system arrangement |
| | Politician | Aid in survival |
| | | Initial funding |
| | | Premises for the company |
| | | Faster start through smooth 'red tape' |
| | Father | Better people management |
| | | Company strategy |
| | | New venture creation |
| **Growth** | Mentor | Holistic business know-how |
| | | Speed-up the growth |
| | | Keep the right direction |
| | | Sustainable growth |
| | | Improved work of the board of directors |
| | | Business renewal before declining |
| | | Networking for: products, production, markets |

**Table 30** (Continued)

| Life cycle stage of the business, technology, product line, product | External expert | Benefits |
|---|---|---|
| | Coach | Quality system development |
| | | Good risk management |
| | | Better productivity |
| | | Better profitability |
| | | Process improvement |
| | | New markets |
| | | Marketing |
| | | Customer relations |
| | | Supplier management |
| | | IT application support |
| | | Labor relations management |
| | | Production technologies |
| | | Quality system development |
| | | Operations /Production management – improvements |
| | | Outsourcing |
| | | Production location decisions |
| | | IT utilization in production |
| | | Industrial relations |

**Table  30**  (Continued)

| Life cycle stage of the business, technology, product line, product | External expert | Benefits |
|---|---|---|
| | Guru | Definition of the 'right products' for the business |
| | | Improved products |
| | | New products |
| | | New business ideas |
| | | Technology base building and maintenance |
| | | New markets |
| | | Better risk management |
| | | Lower level of WIP |
| | | Better capacity usage by removing bottlenecks |
| | | IT solutions |
| | Angel | Better time-to-market |
| | | Better financial processes |
| | | Better cash situation |
| | | With better financial management better business decisions |
| | | Faster investments |
| | Politician | New public customers |
| | | Winning in competition |
| | | Partnership with local actors |
| | | Lobbying: rules & regulations, free trade, etc |
| | Father | Better people management |
| **Mature** | Mentor | Holistic business know-how |

**Table 30**  (Continued)

| Life cycle stage of the business, technology, product line, product | External expert | Benefits |
|---|---|---|
| | Coach | Less waste |
| | | Better utilization of the human resources |
| | | Knowledge base building |
| | | Better risk management |
| | | Process improvement |
| | | Marketing |
| | | Customer relations |
| | | Supplier management |
| | | IT application support |
| | | Labor relations management |
| | | Production technologies |
| | | Quality system development |
| | Guru | Sales (turnover)  improvement |
| | | Sales (turnover)  improvement through partnerships |
| | | Production cost reductions |
| | | Latest technologies in use |
| | | Faster NPD and product improvements |
| | | Artistic features to the products |
| | | Lower WIP level |
| | | Better capacity utilization through bottleneck removal |
| | | New markets |
| | | IT solutions |

**Table 30** (Continued)

| Life cycle stage of the business, technology, product line, product | External expert | Benefits |
|---|---|---|
| | Angel | New funding |
| | | New partnerships |
| | Politician | Help in securing the continuation of the business |
| | Father | Better people management |
| | | Company strategy |
| | | New venture creation |
| **Decline / renewal** | Mentor | Holistic business know-how |
| | | Faster turn around of the company |
| | | Creating new businesses from the spin-off's |
| | Coach | Business process re-engineering |
| | Guru | 'Quality label' |
| | | Faster NPD and product improvements |
| | Angel | Faster turn around of the company |
| | Politician | Help in securing the continuation of the business |

The test shows that resulting taxonomy is reliable in a way that it describes all aspects knowledge that SME's are using for the benefit of their business performance.

**Discussion**

The knowledge and even the external knowledge is so axiomatic to be beneficial to business operations that it has not to be justified. Consulting, mentoring and business training have been significant ways to transfer some expertise from those who have the knowledge to those who do not know enough.  However there is not so much systematic knowledge about how certain knowledge can influence on the business performance if transferred to a SME for instance. There are studies of subsets of this phenomena. Roberts (1995) has results about how the mentors in the organization can improve the success of the R&D function. Wong (2005) has explained the critical success factors for implementing knowledge management in SME's. But any of these studies do not indicate, what knowledge at what stage of the business life cycle gives the best results.

This research has produced a tool, the taxonomy, to continue the work done already by defining more precisely the knowledge what SME's are using. The three level taxonomy will be valuable aid.

The research covered a vast number of articles and books, it utilized an extensive survey and some interviews with professionals and based on these the taxonomy can be claimed to cover the majority of the whole spectrum on external business related knowledge. It might me however that when extending the research to the utilization and to other geographical locations that new items will appear. This was the case already in this research when the role of the politician was defined based on the research material from Finland and the role of the father was defined based on the material from Thailand.

Typical to the qualitative research is that it is always partially subjective and therefore it will never have the characteristics of 'total truth'. Here the taxonomy presents the understanding of the phenomena by the researcher at the given time of the history and even the subjective understanding will develop thrugh further research in this area.

# CONCLUSIONS AND RECOMMENDATIONS

The objective of this research was to answer two research questions:

1. What types of classifications have been used in knowledge transfer?
2. What is the company external knowledge taxonomy that can be used to study external knowledge usage to the benefits of SME's?

The research presents based on an extensive literature review several classifications of company external knowledge, which are not found to be operational for research purposes when it comes to questions like what type of external knowledge can be transferred to a company in order to improve its performance.

The research presents as a result a three level hierarchical taxonomy that meets the requirements as specified in the second research question.

Sykes (1991) has presented several criteria that can be used to assess the findings in qualitative research. Her quality criteria include first of all the apparent validity or the face validity which is fulfilled when the research method produces the kind of information that is wanted or expected. This research fulfils this apparent validity criteria since it fills the gaps identified in the then existing knowledge space.

*Internal validity* according to Sykes *(1991)* refers to the coherence of the findings – to the snugness of the fit between the data and the findings and conclusions. The taxonomy developed through a concept creation process fits well into the research paradigms of the Industrial Engineering in sense that in can be used as an instrument to explain company performance in relation to the usage of external knowledge resources. Even though it cannot be claimed that the model is the best one possible, it is proved in the research to be working and it nicely fulfils its purpose.

Sykes (1991) defines *the Theoretical validity* as to the justifiability of research procedures in terms of established theory. This research was carried out through the

general principles of the concept/theory building like the one documented by Carlile and Christensen (2005).

*Consultative validity* according to Sykes (1991) *refers* to the validation of data or interpretations through consultation with those involved in the research process. The supervisor of this research played active role throughout the research process. They actively participated in discussion, provided feedback, carried out very important part of the data collection and accepted the intermediate results.

The difference between *reliability* and validity is that validity focuses on the meaning and meaningfulness of data, whereas reliability focuses on the consistency of results.

Different methods may and usually do lead to different results, it is important that the entire process is made 'transparent' to readers of the research (Sykes, 1991). This means that the research must be documented so that a reader can follow the researcher's assumptions, reasoning and interpretations. In practice this means also that sufficient proof for reliability and validity is that a research study is well documented.

They key question about *objectiveness* of the research is that: "*Could someone else have come to the same conclusions?*". Someone else could have, but the problem is that there is now to prove it one way or another. This research cannot be repeated exactly the same way by another person and not even with the same researcher.

Here one could use also the teleological explanation of the results of this research. Explanation by design, or teleology, is "the use of design, purpose, or utility as an explanation of any natural phenomenon". An object or a behavior is said to be teleological when it gives evidence of design or appears to be directed toward certain ends. The features of organisms that may be said to be teleological are those that can be identified as adaptations. Adaptations are features of organisms that have come

about by natural selection because they serve certain functions and thus increase the reproductive success of their carriers. Here the aim of the research was clear and the target was achieved. This means that the result was an unbounded design or contingent teleology, since the end-state was not specifically predetermined, but rather was the result of selection of one from among several available alternatives through the concept creation research process.

As a summary it is fair to claim that the research has had sufficient validity and reliability and the result fulfills the requirements of a scientific research. By doing so in this research a taxonomy ahs been defined specifying the different roles of external experts i.e. knowledge owners can be described as follows:

- Mentors
  o Greater influence in the early phases of the company's life cycle
  o Good in company turmoil
  o In connection to organized incubators
  o Good mentor always can help  the company
  o Mentor is useful but the responsibility remains at the company
- Coaches
  o Role in developing methods for the company
- Gurus
  o Better not to be a holistic business expert
  o Valuable in product and production development
  o Valuable in fact finding for what ever purposes
  o Not strong in giving opinions
- Angels
  o Angels are helpful in all stages
  o Bring in addition to funding some business expertise (markets, technology, customer segments, …)
  o Banks
  o Agencies (in Finland Finnvera, SITRA, TEKES, E-Centers)

- Politician
    - Business is always a bit or a lot politics, too
    - The political methods as well as political connections can support the business (both SME's and the large ones)
- Father
    - Sometimes the real father is mentor and angel in addition to being just a father
    - Family tradition should be obeyed in family businesses

This research is not about the knowledge transfer but throughout the research it assumed that the external knowledge can be transferred with various methods like:

- Training
- Dialogue between the company and the expert i.e. the knowledge owner
    - Regular meetings
    - Ad hoc phone contacts
    - Ad hoc e-mail contacts
- Written materials
- Meetings with a larger representation from the company
- Networking
    - IT
    - Market research
    - R&D
    - Logistics
    - HR
- Explaining the writing knowledge to the entrepreneur by mentor/coach
- Limited and defined period of work inside the company
- Action learning
- Catalyst between global expert and the entrepreneur
- Long lasting collaboration – mentoring

This research is also not about the obstacles and catalysts of the knowledge transfer. However throughout the research it assumed that there are obstacles in using external knowledge like:

- To find the experts who could offer some help
- Limitations in own knowledge base
- Fear of spreading business secrets
- Language barriers
  - Both natural language differences but also
  - Different languages because of different personalities, background, age differences, theoretical-practical, etc.
- Experts are not really experts
- Cost of expert work
- Fear of loosing independence
- Difficulty in utilizing the available knowledge
- Time limitations – scheduling problems
- Mistrust
- Attitudes – an entrepreneur knows everything and can do everything by himself
- Some knowledge – especially from the higher education institutions – is seen as to theoretical
- Entrepreneurs like to work alone
- Overestimating own knowledge
- Fear of …
  - hidden interests (harmful) of the expert
  - doing things in different way based on the expert advice
- Bad experiences (from wrong choices)
- Conflicting interests between the expert and the entrepreneur
- Modesty of the entrepreneur
- Own bride – I know what is best for me
- No confidence

- No idea how to terminate the relationship if needed
- Lack of service providers
- Do not understand the true cost of own work
- Un-social behavior
- Independence (stubborn)

**Contribution and the value of the study**

The focus of this study was in the external knowledge valuable to any given company in any given business setting. The objective of this study was to create a taxonomy to business external knowledge. The objective also was to create new understanding and knowledge about the possibilities, advantages, restrictions and limitations of the taxonomy.

In order to meet the objectives set for the research, an extensive literature search on knowledge management and related topics was conducted. The literature was studied in order to develop the taxonomy and to design the empirical data collection and analysis to meet the all quality criteria of scientific research.

Two different types of empirical studies were conducted. An extensive survey with people of external knowledge expertise was carried out in Finland. Also a round of interviews was conducted with business managers and business external knowledge owners from Finland, US and Thailand.

The results of this research show that the taxonomy can be created and it can be used by business actors to better define the context where knowledge is shared between the business and an external knowledge owner.

The survey produced as a side product better understanding about how entrepreneurs or business managers can utilize external expertise in different stages of the life cycle (the life cycle of the company, of the used technologies, of the product lines and of the products). It became clear that it is very likely that the need for

external knowledge varies through the various phases. This was however not tested in this research.

There are continuous problems and challenges with SMEs in countries that were part of the empirical study and the similar questions have been raised elsewhere which came clear through the literature survey. The companies tend to have problems in technology development, networking and in being able to hire skilled workers (Executive Summary 2004). All these aspects have a tight connection to the knowledge management. The challenge is not only with the SME's. Dhanani and Scholtès (2002) argue that "Thailand needs to learn from other countries…" when it comes to programs to support the competitiveness of the Thailand's manufacturing industry. The external knowledge is valuable in all manufacturing product categories as presented by Poapongsakorn and Tangkitvanich (2003) i.e. (1) resource-based products, (2) labor-based products, (3) capital- based products and (4) technology-based products. Here again the balance between the various types of expertise can vary and through the life-cycles as well, but the basic categories apply here as well as they do elsewhere. This research showed both through the literature review and through the surveys and interviews that there are differences between countries in respect to utilizing external knowledge for the benefits of the business.  The research however does not explain scientifically what these differences are. This must be studied later with a different research question in mind.

This study contributes to Knowledge Management literature in many ways. First, it offers a contribution to Knowledge Management research, because so far the literature has not much covered the issue of business external knowledge ontology. Relatively few empirical studies have been done in real business settings.

Developing and applying the external knowledge taxonomy in different business situations and making it possible to build causal relationships between the usage of the external knowledge and the performance of the business entities.

Comparing the result to the classifications presented in the literature review the following summary can be presented:

**Table 31** Theoretical contribution

| Taxo-nomy | Mentor | Coach | Guru | Angel | Poli-tician | Father |
|---|---|---|---|---|---|---|
| Savidge | Mentor | Coach | Guru | Angel | Guru | Mentor |
| Aristo-telian | Phrónésis Noûs | Téchné | Epistémé Sophía | Epistémé Sophía | Téchné | Phrónésis |
| Explicit – tacit – implicit | Mostly tacit | Mostly explicit but some tacit | Mostly explicit | Mostly explicit | Mostly tacit | Mostly tacit |
| Lippit | Advocate Expert Collabo-rator Reflector | Trainer Alterna-tive identifier Collabo-rator Process specialist Reflector | Collabo-rator Fact finder | Collabo-rator | Expert | Reflector Collabo-rator |
| Johnson – Lorenz – Lundvall | know why know how know who | know what know how know how | know what | know what know who | Know who | Know why |

The table shows the richness of the new taxonomy in comparison to the presented previous classifications. For instance the SECI concept proposed by Nonaka and Takeuchi (1995) does not take into account the real content of the knowledge. It is rather easy to argue that the SECI spiral is not similarly practical when the question is about knowledge about bank loans compared to situation where the company needs to get to know the political decision making in a new business location.

The main contribution of the study is in showing that the taxonomy on business external knowledge is a suitable and practical tool for business practice improvement. The taxonomy helps the management practioners better analyze the knowledge they really need and can utilize and then plan for a proper transfer.

**Limitations of the research**

Several limitations can be recognized in this research. Here briefly the limitations of the theoretical framework, empirical data, data analysis and the applicability are considered.

The theoretical foundation of the research has been that of the knowledge management in general and knowledge classification especially. These have been studied from various point of view but systematica review on very important aspects like the knowledge processes: knowledge creation, knowledge sharing, and knowledge transfer as well as the knowledge  repostories have not being paid much of attention to.  The taxonomy that has been created implicitly assumes that the external knowledge as defined can be shared or transferred. It however does not assume that the transfer or sharing is similar in all situations.

One theoretical assumption has been that SME's do need different types of external (knowledge) help in different situations. In this research a business life cycle model has been used. Hower there are a great number of models to describe the situation in a SME.  Also the strongest factor influencing on the needs of external help

might not depend only on the stage in life cycle of the company but some other dynamic elements like product life cycles or technological life cycles. It can also depend on other significant changes in the business (internal or external) that cannot be placed directly into a predefined stage in the life cycle. Even the business life cycle model itself has the limitation that in most cases the entrepreneur can describe the position on the life cycle only afterwards from some historical data and not in real time.

The empirical data was collected by surveys and interviews. The number of participants of any survey or any interviews is limited by the time and effort possible to use in the research. The data was collected mainly in Finland and partly from sources in Thailand and in the US. To get a more comprehensive picture for the taxonomy many other countries and business cultural areas could have been included and they might have brought some other aspects into the results. The empirical data was originally designed to be of qualitative nature and not to be meant for quantitative analysis. A better planning in that respect had given with a little extra work much better possibilities for statistical analysis as well.

The data analysis was defined in the very beginning to be based on the contents of the surveys and the interviews. The analysis was an inductive reasoning based on the methods of the Grounded theory. This gave the structure and the content to the taxonomy. Some explanations to the taxonomy were created through statistical analysis which also worked as a test of the concept.

The results were validated with two tests. One test was with two SMEs in rather similar business circumstances (high tech, Finland, away from the metropolitan areas) and the other with 20 SMEs in Finland and Thailand with a little bigger variance in business settings. All possible variables the make SMEs different have not been used and a larger sample might bring into light new aspects as well.

Taking these limitations into account the research still can provide some recommendations, which are discussed in more detail in the following paragraphs.

**Recommendations**

**Recommendations to Researchers**

The new taxonomy gives researchers new possibilities to carry out research on subjects like:

1. the influence of the various external knowledge elements to the performance of SMEs at various stages

   - better time-to market,

   - faster growth,

   - better funding,

   - faster ramp-up (and ramp-down when needed),

   - better HR processes,

   - better quality

2. The different mechanisms in knowledge transfer

   - success and failure

   - the good practices and not so good practices

   - causes and effects

3. The meaning of the values of the knowledge owner and the knowledge seeker - what to the values mean in respect of success and failure.

4. The differences of external knowledge utilization in various national contexts (Thailand, Finland, USA, UK, France, Slovenia,) similarities - differences

5. Assessment of the quality of the external knowledge

   - methods

   - tools.

**Recommendations to agencies and to the KIBS providers**

The research and its results show that the variation of the needs of external expertise is significant. The companies might need different type of expertise at

different times. The model should help the various public (international, government, regional and local) agencies in Thailand like in Finland to understand this better and then tune the services to meet better the requirements. This research was not about measuring the different types of knowledge companies need, but the result that came as a side product and has not been proved scientifically anyhow shows the expert areas that much utilized by the SMEs:

- Marketing
- Financial Management
- Operations Management
- Business Planning
- Strategic management
- Research and Development
- People Management
- Networking
- Legal Issues
- Change management
- Risk Management
- Quality Management
- Sales
- Logistics
- General management
- Purchasing
- Politics
- Knowledge management
- Information systems

At least these should be on the agenda when planning the service for the SMEs. At the same time these agencies should have tools and methods to analyze the immediate knowledge needs of the SME's in order to get the supply meet with the demand.

**Recommendations to entrepreneurs SME managers**

The research has produced taxonomy of external knowledge that SMEs could and should utilize to the benefits of their success. This model helps the entrepreneurs and the managers of SMEs to better identify their real knowledge needs at any given time. This would save a lot of time and money by reducing the usage of wrong expertise and at wrong times. By analysing carefully own business situation the managers should be able with the taxonomy to determine the right type of expert to be used.

The further research will hopefully tell some scientific facts about causal relations between the usage of correct expertise and the benefits to the company.

**Recommendations to large companies partnering with the SME's**

The SME's many times depend on their larger partners as source of external knowledge. With the taxonomy developed and with the more detailed analysis of the knowledge needs, the managers of larger corporations can more easily identify the "knowledge shortages" the SME's might have. The model gives also a common 'language' to managers in various organizations to understand the problems and opportunities of knowledge management in general and external knowledge management especially.

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**APPENDICES**

**Appendix A**
Questionnaire in Finland

**Questionnaire in Finland**

| Original questions in Finnish | Translations by the author into English | Supporting drawings |
|---|---|---|
| Mitä osaamista yrittäjät mielestäsi tarvitsevat ennen varsinaisen yritystoiminnan aloittamista?<br><br><br>Minkälaisella tuella valmisteluvaihetta voidaan nopeuttaa ja onnistumisen todennäköisyyttä kasvattaa? | What knowledge to your understanding the entrepreneur needs before starting the business?<br><br>What support would speed up the preparation phase and what would increase the potential success? | Yrityksen/tuotteen/teknologian elinkaari<br><br><br><br>Drawings:<br><br>**Title**: Life cycle of a company / technology<br>**Y-axis**: Business volume<br>**X-axis:** Time<br>**Time-line Phases:**<br>Idea / Incubation / Preparation<br>Start<br>Growth<br>Competition<br>Maturity<br>Decline / Renewal |
| Minkälaista osaamista tiedät tarjotun yrittäjille tässä vaiheessa? | What knowledge to your understanding has been offered to the potential entrepreneurs? | |

| Mitä osaamista yrittäjät mielestäsi tarvitsevat yritystoiminnan aloitusvaiheessa? Minkälaisella tuella alkua voidaan nopeuttaa ja onnistumisen todennäköisyyttä kasvattaa? | What knowledge to your understanding the entrepreneur needs by starting the business? What support would speed up the staring phase and what would increase the potential success? |  **Start-up** |
|---|---|---|
| Minkälaista osaamista tiedät tarjotun yrittäjille tässä vaiheessa? | What knowledge to your understanding has been offered to the potential entrepreneurs? | |
| Mitä osaamista yrittäjät mielestäsi tarvitsevat yritystoiminnan siinä vaiheessa, kun toiminta on vahvassa kasvussa?<br><br>Minkälaisella tuella on vaikutusta kasvun nopeuteen?<br><br>Miten onnistumisen todennäköisyyttä kasvattaa? | What knowledge to your understanding the entrepreneur needs when the business has a potential for fast growth?<br><br>What support would speed up the start-up and what would increase the potential success? |  **Growth** |

| Minkälaista osaamista tiedät tarjotun yrittäjille tässä vaiheessa? | What knowledge to your understanding has been offered to the entrepreneurs? | |
|---|---|---|
| Mitä osaamista yrittäjät mielestäsi tarvitsevat yritystoiminnan kovassa kilpailussa?<br><br>Miten onnistumisen todennäköisyyttä voi tuella kasvattaa? | What knowledge to your understanding the entrepreneur needs when they are facing fierce competition?<br><br>What support would increase the potential success? | <br>**Competition** |
| Minkälaista osaamista tiedät tarjotun yrittäjille tässä vaiheessa? | What knowledge to your understanding has been offered to the entrepreneurs? | |
| Mitä osaamista yrittäjät mielestäsi tarvitsevat yritystoiminnan kypsässä vaiheessa?<br><br>Miten onnistumisen todennäköisyyttä voi tuella kasvattaa? | What knowledge to your understanding the entrepreneur needs when the business has reached maturity?<br><br>What support would increase the potential success? | <br>**Mature** |
| Minkälaista osaamista tiedät tarjotun yrittäjille | What knowledge to your understanding has been offered to | |

| tässä vaiheessa? | the entrepreneurs? | |
|---|---|---|
| Mitä osaamista yrittäjät mielestäsi tarvitsevat, kun<br><br>• liikevaidon kehitys on negatiivinen<br>• tuotteet ovat vanhentuneita<br>• tarvitaan radikaali muutos<br>• tarvitaan sukupolven vaihdos<br>• tarvitaan fuusio tms?<br><br>Miten onnistumisen todennäköisyyttä voi tuella kasvattaa? | What knowledge to your understanding the entrepreneur needs when<br><br>• the turnover development is negative<br>• the products become out-of-date<br>• there is a need for radical change<br>• there is a need for letting the younger generation to take over<br>• there is a need for a merger or something equally radical changes?<br><br>What support would increase the potential success? | Yrityksen/tuotteen/teknologian elinkaari<br><br><br><br>**Decline / renewal** |
| Minkälaista osaamista tiedät tarjotun yrittäjille tässä vaiheessa? | What knowledge to your understanding has been offered to the entrepreneurs? | |

| | | |
|---|---|---|
| Mitä muuta ulkopuolista osaamista mielestäsi yritykset tarvitsevat ja voisivat hyödyntää? | What other external knowledge entrepreneurs need and could utilize? | |
| Mitkä mielestäsi ovat ulkoisen osaamisen käytön esteitä? | What are to your understanding the causes not using external knowledge? | |
| Mitkä mielestäsi ovat parhaat vauhdittajat – motivoivat tekijät - ulkoisen osaamisen käytölle. | What are to your understanding best motivation factors to utilize external knowledge? | |
| Mikä merkitys mielestäsi on luottamuksella osapuolten välillä, kun puhutaan ulkopuolisen osaamisen käytöstä?  Onko kysymys luottamuksesta symmetrinen – molemmin puolinen?  Miten luottamusta voidaan lisätä? | How trust affects to your understanding the use of external knowledge?  Is the question about trust symmetric i.e. same expectations both ways?  How trust can be improved? | |
| Mitkä ovat mielestäsi | To your | |

| parhaat tavat välittää, siirtää, osaamista yrityksen käyttöön (kirjallisesti, palaverit, ...)? Miten itse olet toiminut? Mikä on sopiva tapa kommunikoida (säännöllisesti, asian niin vaatiessa, ...)? | understanding, what are best ways to transfer knowledge from outside to the company (in writing, meetings, etc) How have you self operated? What are suitable frequencies for communications (regularly, when needed, ...)? | |
|---|---|---|
| Onko mielestäsi tarpeen siirtää osaamista yritykseen, vai riittääkö, että yrityksessä tiedetään, mistä tarvittava osaaminen on saatavilla? | Is it necessary to transfer all the knowledge into the company, or is it enough that the entrepreneur knows where the knowledge can be obtained, when needed. | |
| Yritysten apuna toimii mentoreita. Heidän oletetaan olevan kokeneita yritystoiminnan taitajia, jotka välittävät kokemustaan yrityksiin. Tunnistato tällaisen osaamisen | There are mentors available to the entrepreneurs. They are expected to be experienced business people, who share their business experiences to others. Do you recognize a need for this kind of | |

| | | |
|---|---|---|
| tarpeen? Voitko antaa esimerkkejä | knowledge? Can you give some examples? | |
| Yritysten apuna toimii valmentajia. Heidän oletetaan olevan osaajia, joilla on menetelmäosaamista yritystoiminnan osa-alueilta, vaikkeivat itse olisi toimineetkaan yrittäjinä. Tunnistato tällaisen osaamisen tarpeen? Voitko antaa esimerkkejä? | There are coaches available to the entrepreneurs. They are expected to be people with skills to various methods, processes and practices in business. They have not necessary the business experience as whole. Do you recognize a need for this kind of knowledge? Can you give some examples? | |
| Yritysten apuna toimii (huippu)asiantuntijoita - guruja. Heidän oletetaan olevan osaajia, joilla on tietyn kapean alan tieto-taitoa (tuotteisiin, teknologiaan, tuotantoon, jne liittyen),  vaikkeivat itse olisi | There are specialists (gurus) available to the entrepreneurs. They are expected to be people with knowledge to some specific area like products, technology, production etc. They have not necessary the business experience as whole. Do you recognize a | |

| | | |
|---|---|---|
| toimineetkaan yrittäjinä. Tunnistatko tällaisen osaamisen tarpeen? Voitko antaa esimerkkejä? | need for this kind of knowledge? Can you give some examples? | |
| Liittyykö mielestäsi yrityksen rahoitustoimintaan sen eri muodoissaan erityisosaamista, josta yrittäjälle on apua? Kerro esimerkkejä! | Do you see there would be a need for special knowledge on financing the business? Show some examples! | |
| Yritykset toimivat lisääntyvässä määrin verkostoissa ja verkostoina. Liittyykö tähän toiminnan piirteeseen mahdollisuus hyödyntää toisissa yrityksissä olevaa osaamista? | Companies operate more and more in networks. Do you see that this way of operation gives an opportunity to utilize knowledge from other companies? | |
| Yrityksille on tarjolla erilaisia yhteiskunnan ja yksityisten tarjoamia palveluja osaamisen kasvattamiseksi. Mitkä tahot ovat | Entrepreneurs and companies receive offers both from private and public sector organizations to increase and improve the | |

| mielestäsi hyvin onnistuneet tässä tehtävässä ja missä on parantamisen varaa? | knowledge of the company. Which organizations to your understanding have performed well and where do you see room for improvement? | |
| --- | --- | --- |

**Appendix B**
Questionnaire in Thailand

**Questionnaire in Thailand**

The research is based on the assumption of a general product/business life cycle as described below. There are however situations of different business outcomes, but as a general framework this will be used.

The challenge is to define all the knowledge that is needed by the entrepreneur/management to run business successfully.



| Question | Answers |
|---|---|
| 1. What knowledge to your understanding the entrepreneur needs before starting a business?<br><br>From whom/where an entrepreneur could receive this knowledge (authorities, consultant, university, other enterprises, family, …)<br><br>What support from outsiders (external) would speed up the preparation phase and what would increase the probability and potential of success? | |

| | |
|---|---|
| 2. What knowledge to your understanding the entrepreneur needs by starting the business?<br><br>From whom/where an entrepreneur could receive this knowledge (authorities, consultant, university, other enterprises, family, …)<br><br>What support from outsiders (external) would speed up the staring phase and what would increase the probability and potential of success? | |
| 3. What knowledge to your understanding the entrepreneur needs when the business has a potential for fast growth?<br><br>From whom/where an entrepreneur could receive this knowledge (authorities, consultant, university, other enterprises, family, …)<br><br>What support from outsiders (external) would speed up the start-up and what would increase the probability and potential of success? | |
| 4. What knowledge to your understanding the entrepreneur needs when they are facing fierce competition?<br><br>From whom/where an entrepreneur could receive this knowledge (authorities, consultant, university, other enterprises, family, …)<br><br>What support from outsiders (external) would increase the probability and potential of success? | |
| 5. What knowledge to your understanding the entrepreneur needs when the business has reached maturity? | |

| | |
|---|---|
| From whom/where an entrepreneur could receive this knowledge (authorities, consultant, university, other enterprises, family, …)<br><br>What support from outsiders (external) would increase the probability and potential of success? | |
| 6. What knowledge to your understanding the entrepreneur needs when<br>• the turnover development is negative<br>• the products become out-of-date<br>• there is a need for radical change<br>• there is a need for letting the younger generation to take over<br>• there is a need for a merger or something equally radical changes?<br><br>From whom/where an entrepreneur could receive this knowledge (authorities, consultant, university, other enterprises, family, …)<br><br>What support from outsiders (external) would increase the probability and potential of success? | |

**Appendix C**
Data analysis of the survey

## Data analysis of the survey

In the following Appendix table the frequencies of responses in various expertise categories are presented.

**Appendix Table 1**  The frequencies of responses

| Knowledge category | Life Cycle Stage | | | | |
|---|---|---|---|---|---|
| | Idea | Start | Growth | Maturity | Decline / renewal |
| **Business Planning** | **30** | **14** | **9** | **5** | **3** |
| Holistic view | | | 1 | 1 | |
| Establishing business | 2 | | | | |
| Business plan | 16 | 1 | 4 | 1 | 2 |
| Business idea analysis | 7 | 11 | | | |
| Ownership | 2 | | 1 | | |
| Board | | 1 | 1 | | 1 |
| Company governance (franchise, lic, .) | 1 | | | | |
| Doing business | 2 | | | | |
| Internationalization | | 1 | 2 | 1 | |
| Exit plan | | | | 1 | |
| IPO | | | | 1 | |
| | | | | | |
| **Strategic management** | **18** | **3** | **11** | **3** | **4** |
| Strategy | 16 | 1 | 9 | 2 | 3 |
| Competitive advantage | 2 | | | | |
| Critical success factors | | 1 | | | |
| SWOT | | 1 | | 1 | |
| Core competence | | | 2 | | 1 |
| | | | | | |
| **Change management** | **0** | **0** | **10** | **1** | **5** |
| Change management | | | 2 | | 3 |
| Management change | | | | | 2 |

**Appendix Table 1**  (Continued)

| Knowledge category | Life Cycle Stage | | | | |
|---|---|---|---|---|---|
| | Idea | Start | Growth | Maturity | Decline / renewal |
| Growth management | | | 7 | | |
| Analysis skills | | | 1 | | |
| Expansion | | | | 1 | |
| | | | | | |
| **General management** | **1** | **0** | **2** | **0** | **0** |
| Management team | 1 | | | | |
| Management | | | 2 | | |
| | | | | | |
| **People Management** | **9** | **3** | **11** | **4** | **1** |
| HRM know-how | 2 | | 9 | 4 | 1 |
| Team building | 2 | 1 | | | |
| Self-knowledge | 5 | | | | |
| Self-management | | 2 | 1 | | |
| Recruiting | | | 1 | | |
| | | | | | |
| **Financial Management** | **26** | **19** | **26** | **7** | **2** |
| Funding alternatives | 9 | 5 | 14 | 2 | 1 |
| Funding mechanisms | | 5 | 1 | | |
| Start funding | 2 | | | | |
| Venture Capital | | 1 | 1 | | |
| Budgeting | 4 | 3 | | | 1 |
| Cash flow calculations | 2 | | | | |
| Book keeping | 2 | 1 | | 1 | |
| Cost accounting | 7 | 3 | 3 | 3 | |
| Government grants | | 1 | 3 | | |
| Share capital | | | 2 | 1 | |
| Balance sheet analysis | | | 1 | | |
| Financial Management | | | 1 | | |

**Appendix Table 1**  (Continued)

| Knowledge category | Life Cycle Stage | | | | |
|---|---|---|---|---|---|
| | Idea | Start | Growth | Maturity | Decline / renewal |
| **R&D** | **4** | **2** | **8** | **12** | **6** |
| Innovations | | | 2 | 2 | |
| Product development | 2 | | 1 | 4 | 1 |
| Productization | 2 | 2 | | | |
| Invest in R&D | | | 3 | | |
| R&D | | | 2 | 5 | 3 |
| Re-newing products | | | | 1 | 2 |
| | | | | | |
| **Knowledge management** | **0** | **0** | **0** | **1** | **0** |
| Knowledge Management | | | | 1 | |
| | | | | | |
| **Information systems** | **0** | **0** | **1** | **0** | **0** |
| MIS | | | 1 | | |
| | | | | | |
| **Legal Issues** | **12** | **4** | **1** | **1** | **1** |
| Company formation | 2 | | | | |
| Taxation | 1 | 1 | | | |
| Juridical issues | 3 | | | | |
| Red tape' | 3 | 1 | | | |
| IPR (Patents, trademarks, etc) | 3 | 1 | | 1 | |
| Contracts, agreements | | 1 | 1 | | |
| Acquisition and mergers | | | | | 1 |
| | | | | | |
| **Networking** | **4** | **0** | **16** | **4** | **0** |
| Networking | 4 | | 15 | 4 | |
| Partnership | | | 1 | | |
| | | | | | |
| **Politics** | **1** | **1** | **0** | **0** | **0** |

**Appendix Table 1**  (Continued)

| Knowledge category | Life Cycle Stage | | | | |
| --- | --- | --- | --- | --- | --- |
| | Idea | Start | Growth | Maturity | Decline / renewal |
| **Risk Management** | **7** | **0** | **1** | **1** | **0** |
| **Quality Management** | **2** | **1** | **5** | **0** | **0** |
| **Marketing** | **24** | **12** | **31** | **9** | **5** |
| Marketing strategy | 2 | | | | |
| Marketing | 10 | 5 | 14 | 2 | 1 |
| Markets | 5 | 1 | 1 | 1 | |
| Market analysis | | | 2 | 4 | 2 |
| Customer relationship | | 3 | 9 | | 1 |
| Customer needs | 3 | 1 | | | |
| Competition | 3 | 2 | | 1 | |
| Competitors | | | 2 | | 1 |
| Pricing | 1 | | 3 | 1 | |
| **Sales** | **0** | **0** | **5** | **1** | **0** |
| **Operations Management** | **16** | **2** | **36** | **3** | **5** |
| Management | 1 | | | | |
| Business processes | 1 | | | | |
| Core processes | | | 2 | | |
| Profitability | 2 | | 12 | | |
| Productivity | | | 5 | 1 | 2 |
| Product (specs, life cycle, ..) | 4 | 1 | | | 1 |
| Production know-how | 1 | | 2 | | |
| Industry know-how | 2 | | 1 | | |
| Technology know-how | 3 | 1 | 3 | 1 | 2 |
| Substance know-how | 2 | | | | |
| Process Improvement | | | 5 | | |

**Appendix Table 1**  (Continued)

| Knowledge category | Life Cycle Stage | | | | |
|---|---|---|---|---|---|
| | **Idea** | **Start** | **Growth** | **Maturity** | **Decline / renewal** |
| Production investments | | | 1 | | |
| Investment assessments | | | 4 | | |
| Subcontracting / outsourcing | | | 1 | | |
| Automation | | | | 1 | |
| **Logistics** | **0** | **0** | **4** | **1** | **0** |
| Logistics | | | 2 | 1 | |
| Sales channels | | | 1 | | |
| Delivery | | | 1 | | |
| **Purchasing** | **1** | **0** | **1** | **0** | **0** |
| Purchasing | 1 | | | | |
| Sourcing | | | 1 | | |
| **Others** | **0** | **1** | **1** | **0** | **0** |
| Imago Building | | 1 | | | |
| Public relations | | | | | |
| Stakeholder management | | | 1 | | |

**Appendix D**
Data synthesis of the survey

**Data synthesis of the survey**

| Mentor |
|---|
| **Before the start – Preparation – Incubation** |
| What is business, how people act in various business situations. |
| Business logic – how to make money |
| Global business rule of games |
| Business analysis |
| Business idea improvement |
| To Whom – what – how |
| Customer focus |
| Capability to evaluate values and attitudes |
| Self-knowledge: strengths, weaknesses |
| Networking |
| Risk management |
| **Business start** |
| Strategic thinking |
| Problems recognition skills |
| A different/special way of doing business |
| Life-cycle-management - especially crossing the chasm |
| Management skills evaluation and  improvement |
| 'Best expert' selection |
| Cash flow management |
| Business improvement |
| 'Best product' |
| Customers /clientele seizure |
| Production Ramp-up |
| Production planning |
| Globalization |
| Networking |
| **Growth** |

| |
|---|
| Growth management: Challenges/problems of the growth |
| Holistic business understanding |
| Strategic thinking |
| HR – competence management |
| TQM |
| Networking |
| Subcontracting |
| How to extend the growth period |
| Cutting the non profit products / product families / businesses |
| Internationalization / Globalization |
| **Competition** |
| Holistic Business Analysis |
| New business opportunities |
| Continuous SWOT |
| Key manager selection: hiring and firing |
| Networking |
| Management |
| CRM – a new perspective |
| Pricing 'philosophy' |
| **Maturity** |
| Holistic business analysis and improvement |
| Exit strategy - Selling  own business  to others (i.e. cashing) |
| Mergers and acquisitions |
| Balancing between the basic business and new ventures. |
| Networking |
| Change management |
| How to change the management team (CEO, ….) |
| **Decline  and possible renewal** |
| Business analysis |
| **Others – not related to certain points in Life-cycle** |
| Export |

| |
|---|
| New processes |
| Large changes in HR |
| New markets |

| **Coach** |
|---|
| **Before the start – Preparation – Incubation** |
| Starting a company |
| Business planning |
| Strategic management |
| Marketing strategy |
| PR strategy |
| Management |
| Sales |
| HR management |
| Team management |
| R&D management |
| Quality management |
| Company governance systems: |
| • Franchise |
| • Ltd |
| • Inc |
| • Etc… |
| **Business start** |
| Business growth planning(?) |
| Strategic management (vision, mission, strategic choices,… SWOT) |
| Business idea improvement |
| Business planning and improvement. |
| Customer oriented business |
| Customer relationship |
| Competitive positioning |

| |
|---|
| Management (skills) |
| Quality management |
| Contracts negotiation |
| Negotiation skills |
| Cash flow in order |
| Functional planning |
| **Growth** |
| Strategic management |
| Customer relationship |
| Performance improvement (cost control, efficiency, etc) |
| Production system improvement |
| Quality improvement |
| R&D management |
| HR management |
| Technology strategy |
| Marketing strategy |
| Process Management |
| Growth management |
| Networking |
| Supply chain management |
| Business planning |
| Winning team building |
| R&D process analysis and improvement |
| Product differentiation |
| **Competition** |
| Core business process management (identification, modeling, improvement) |
| Core competence 'management' |
| Strategic management |
| Customer relationship management (long term) |
| R&D management |
| HR management |

| |
|---|
| Quality management |
| Pricing |
| Productivity improvement |
| New inventions in products, production, processes |

| **Maturity** |
|---|
| Business planning |
| Strategic management – new strategies(?) |
| Technology strategies |
| Search for new business opportunities |
| Innovation management |
| R&D management |
| Product renewal / cannibalization |
| Reducing 'over service' |
| Risk management |
| HR management |
| IPR strategies |

| **Decline  and possible renewal** |
|---|
| Business reorganization (radical ones) |
| Change management |
| Core processes |
| CRM customer relationship marketing |
| R&D management |
| Cost cutting |

| **Others – not related to certain points in Life-cycle** |
|---|
| Quality |
| Export organization building |

| **Angel** |
|---|
| **Before the start – Preparation – Incubation** |
| Initial Funding |

| |
|---|
| Funding planning |
| 'Right' funding partners |
| Public sector Funding instruments (TEKES, etc) |
| Incubator |
| **Business start** |
| Sources of funding: |
| • Own money |
| • Bank |
| • Grants |
| • Venture funding |
| Funding (possibilities) |
| VC negotiation ('to present things right') |
| **Growth** |
| Grants and public funding for business development and investments |
| New investors |
| Loans from non-banking sources |
| VC |
| Cost of the internal /external funding |
| Balancing the funding/financing |
| IPO expertise |
| Balancing the financiers (own and external) |
| **Competition** |
| Investment funding |
| IPO expertise |
| **Maturity** |
| Funding alternatives |
| IPO expertise |
| **Decline and possible renewal** |
| Funding arrangements |
| IPO expertise |

| **Guru** |
| --- |
| **Before the start – Preparation – Incubation** |
| Accounting<br><br>Cost accounting –profitability<br><br>• Sales – income-turnover<br><br>• Costs – labor – materials – purchase – subcontracting<br><br>• Budgeting<br><br>Marketing<br><br>Markets<br><br>Industry know-how<br><br>Customer needs / customer care<br><br>Competitive environment: competitors and their products<br><br>Competitive advantage<br><br>Product /service concept<br><br>Productization (how to make a project of it, what does it cost)<br><br>Pricing<br><br>Product idea protection (patent, copyright, …)<br><br>Production (products and/or services)<br><br>• What<br><br>• How<br><br>Technology<br><br>Technical knowledge relevant to the planned business (products / production)<br><br>Physical resources – facilities<br><br>Purchases<br><br>Risk management<br><br>Entrepreneurship<br><br>Regulations<br><br>Forms of governance – necessary /obligatory paperwork<br><br>Taxation<br><br>IPR |
| **Business start** |

| |
|---|
| Financing, accounting and metrics |
| • Budgeting |
| • Business accounting |
| Investment calculations |
| Marketing |
| Market entry, market positioning |
| Sales |
| Commercialization / productization |
| Regulations (business, products, etc..) |
| • Taxation |
| • Insurances |
| • Auditing |
| Paper bureaucracy |
| IPR's (patents etc) and other contractual issues (juridical) |
| **Growth** |
| Challenges/problems of the growth |
| Cost/profit accounting |
| Investment calculation |
| Market opportunities |
| Marketing |
| Sales |
| Production (ramp-ups, scale-ups, various forms of production) |
| International marketing |
| Supply chain management (contracts) |
| Superior customer benefit |
| Contractual issues (juridical) |
| Industry know-how |
| **Competition** |
| Marketing |
| International markets |
| Competitor analysis |

| |
|---|
| Customer service |
| Sales |
| Business accounting |
| Cost analysis and accounting |
| Production management |
| Productivity |
| Efficiency |
| Pricing calculations |
| Contractual issues (juridical) |
| **Maturity** |
| Markets – market signals |
| Marketing |
| Product development |
| Technologies |
| Business cycles (relevant) |
| Logistics management |
| Automation |
| Contractual issues |
| (juridical) |
| Industry foresight |
| |
| **Decline and possible renewal** |
| Technology analysis |
| Marketing – market analysis / customer needs / |
| **Others – not related to certain points in Life-cycle** |
| Cultural differences in making international business. |
| Market facts in potential target market areas |
| Marketing |
| PR (publications, web, etc materials) |
| Production |
| Book keeping |
| Legal services |

| IT |
| --- |
| Insurances |
| Taxation |

| **Politician** |
| --- |
| **Before the start – Preparation – Incubation** |
| Public sector gate keepers / opportunities management: <br> • Funding opportunities <br> • Facilities management <br> • Entrepreneurial programs utilization |
| **Business start** |
| • |
| **Growth** |
| • |
| **Competition** |
| • |
| **Maturity** |
| • |
| **Decline  and possible renewal** |
| • |
| **Others – not related to certain points in Life-cycle** |
| • |

| **Others** |
| --- |
| **Before the start – Preparation – Incubation** |
| Intrapersonal skills – not external |
| Knowledge about problems |
| Mentor can bring credibility |
| ICT is an opportunity but also a challenge to an organization. Using right expert in right situation brings benefits and vice versa - wrong expert can cause a lot of |

| problems and expenses. Using a guru when a coach is needed can lead to wasting of time and money. |
| --- |
| **Business start** |
| Mentor can bring credibility |
| **Maturity** |
| Change or die |
| **Others – not related to certain points in Life-cycle** |
| • Wellness |

**Appendix E**
Interviews

**Interviews**

**Interview #1**

| Date of interview | March 18, 2004 |
|---|---|
| Place of Interview | University of Oulu, Oulu, Finland |
| Duration: | 5 hrs |
| Interviewer: | Pekka Kess |
| Interviewee: | WP |
| | |
| | WP is the founding principal of an international business consulting firm specializing in global business development, strategic management, executive mentoring and business venture funding for aggressive, entrepreneurial, high-tech firms. WP has served on the Boards of Directors and Advisors of 24 companies in the United States and Europe. With more than 30 years senior executive and consulting experience in global and high tech business, WP has served on 24 boards of Directors and has held numerous senior executive positions (e.g., director of strategic planning, vice president of sales and marketing and president) in two Fortune 100 firms, several high-tech start-ups and several turn-arounds. |
| | Since founding the Associates in 1990, WP has concentrated on mentoring, advising and performing interim executive roles for aggressive and globalizing high tech businesses. Recently, he has directed the successful launch of a number of European companies from various industries into the North American marketplace – one of which is now the global market share leader and two, USA share leaders. |
| | WP has also been a professor or instructor of business administration at four universities in the United States (University of Washington, University of Southern California, University of California at San Diego and Pepperdine University) and two in Europe (Ecole Polytechnique Fédérale De Lausanne, Switzerland and Oulun Yliopisto, Finland). He is one if the founders of the prestigious Undergraduate Entrepreneurship Program at the University of Southern California and of the New Venture Initiative Program in the Jacobs School of Engineering at the University of California, San Diego. Internationally he co-founded Finland's Bio PD and Global Software Programs and recently designed Finland's Tekes Navigator ("Luotsi") Program aggresiv business leaders. WP continues part-time academic activities today in San Diego State University's |

Entrepreneurship Center and as a Board Member of Tampere University's SKY Program, in Finland.

In May 2006, WP was awarded the prestigious Honorary Doctor's Degree by Finland's University of Oulu for his contributions to both academe, government and business in that country.

Prior to entering the business world, WP was a practicing engineer in the aerospace industry and holds a BS degree in mechanical engineering from the University of California at Berkeley and an MBA in Finance and a Ph.D. in strategic management and entrepreneurship from the University of Washington in Seattle.

## EXTRACT FROM THE INTERVIEW

WP looks the external knowledge from the point of view of the Finnish SME's taking first steps in going to the US market. He thinks that the SME's currently do not have a satisfactory success rate with US entries.

He has worked (as a mentor, coach and guru) for some Finnish companies and he's sure that the success rate can be improved.

An expert can help in avoiding some of the fatal mistakes many companies make without proper guidance. BP uses examples form the cultural differences as well as differences in business practices.

His advice the SME's is to explore the market. By exploring the entrepreneurs will learn the business (by doing).

WP claims that 'selling' in the US is different. This means that it is better to have a local (external expert) to start/help in establishing the sales process.

WP has noticed that the Finns tend to do the (business) planning in a room. His advice is to partner with locals and to do the planning inside the business.

His advice is to do everything rather sooner than later.

For the Finnish companies WP would like to stress that the technology is the easy part of the business. Marketing and sales are areas where the Finnish SMEs need external (=local) help.

"Entrepreneurship is no longer considered a 'solo-hero' game even in the US. It is considered a team game simply because the environment is so complex and fast moving with such high stakes that no one person can do it all. Everyone needs help – the smart one get help"

The benefits from the 'facilitated concurrent planning' where some friendly, reliable

and Finn-knowledgeable help is used:

- synergy is possible
- faster to market
- faster to money
- less risks
- specification of right products to the market
- business model development
- performance measures tuned to the market
- better board of directors

**Interview #2**

| Date of interview | November 5, 2004 |
|---|---|
| Place of interview | MCON Partners, Oulu, Finland |
| Duration: | 0.5  hrs |
| Interviewer: | Pekka Kess |
| Interviewee: | PP  is MSc (Process Engineering) from the university of Oulu. He is also a Certified Management Consultant CMC from the Helsinki Business School.  Currently he is one of the founding partners of MCon Partners Oy. The company is based in Oulu Finland and is a consulting company specializing in high tech business development. The special areas of expertise of PP include: Strategic business planning and development, business process improvement, B2B marketing and CRM. He is a certified service provider of the following TE-center services:<br>* ProStart<br>* PostStart<br>* Kunto<br>* Globaali<br><br>PP  has an earlier working history as follows:<br>1995 - 02 Business consult, Fertigo Oy, Oulu<br>1991 - 94 Director, Tekno Advisors Oy, Oulu<br>1989 - 90 Director, Teknoinvest Oy, Oulu<br>1987 - 89 Consultant,  TEKES Konsultointi, Oulu<br>1985 - 86 Marketing Manager, Slocon Oy, Vantaa<br>1983 - 84 Marketing Manager, Sähköliikkeiden Oy (SLO) Elektroniikka, Vantaa<br>1978 - 83 Project Manager, Oy Nokia Industrial Electronics Helsinki<br>1976 - 77 Design Engineer , Oy Nokia Industrial Automation, Helsinki |

**EXTRACT FROM THE INTERVIEW**

The external knowledge that companies need can be classified into two categories:
- Expert knowledge
- Process Knowledge.

The expert knowledge is related to topics like:
- Market analysis
- Funding possibilities
- Product features and design
- Production possibilities

'These seem to be topics that easy to define. The problem solving process can be fairly easily be written into a format of a project plan. Then It is usually also easy to get some financial help from TEKES or TE Centre."

"Many times the problem we start to solve appears to be different that we actually solve" This means that the manager/entrepreneur has ' a wrong' assumptions about their problems.

There seems to be correlation between the self respect of an entrepreneur and the amount how external expertise one will use. "If the entrepreneur has a low self respect he has great difficulties in using external experts, because thinks that he has failed and therefore must use outsiders"

## Interview #3

| Date of interview | November 5, 2004 |
|---|---|
| Place of interview | MCON Partners, Oulu, Finland |
| Duration: | 1.5 hrs |
| Interviewer: | Pekka Kess |
| Interviewee: | MM is MSc (Electrical Engineering) from the university of Oulu. Currently he is one of the founding partners of MCon Partners Oy. The comapny is based in Oulu Finalnd and is a consulting company specializing in high tech business development. The special areas of expertise of MM include: business strategies, business planning, internationalization, export, board, venture capital, and knowledge based infrastructure development.<br><br>MM has worked earlier:<br>1999 - 02 CEO, Thermo Radiometrie Oy, Oulu<br>1995 - 99 CEO, Spectra Physics VisionTech Oy, Oulu<br>1988 - 95 CEO, Rautaruukki New Technology, Oulu<br>1982 - 87 CEO, Polar Electro Oy, Oulu / Boston, USA<br>1976 - 81 Dept head,, VTT Electronics |

| | 1973 - 76 Project Manager, Nokia Electroncs, Helsinki<br><br>MM  has held some board positions:<br>1996 - 02 Teknoventure Oy,<br>1991 - 95 Start Fund of Kera Oy<br>1990 - 91 Teknoinvest Oy,<br>1988 - 96 Several small high tech companies. |
| --- | --- |

**EXTRACT FROM THE INTERVIEW**

The external knowledge is important source of innovations in many companies. The challenge is the innovation diffusion and how to reduce friction there.

All stakeholders can be seen as sources of knowledge. In case of external stakeholders we can say its is question about external knowledge. There are many valuable stakeholders like
- Subcontractors
- Suppliers
- Customers
- VC's

 "An interesting point in knowledge transfer is the role of networks. Maybe the best way to transfer knowledge is the picky bag. In other words when people move from one organization to another they carry their knowledge with them. Then its up to the recipient organization to make sure that it can utilize the new knowledge"

"Knowledge transfer is definitely one method in risk management"

"In our business we can see needs for both strategic and operational knowledge. For instance in market or marketing knowledge we can see topics like
- Correct timing
- Correct product specification
- Maintaining the market position
- Brand
- Understanding the customer needs
- Understanding the customer as whole
- Learning from the customer

**Interview #4**

| Date of interview | November 18, 2004 |
|---|---|
| Place of interview | Smart House, Technopolis, Oulu, Finland |
| Duration: | 2 hrs |
| Interviewer: | Pekka Kess |
| Interviewee: | PR  is a lookout and a pilot for technology companies. As an international independent business executive, he is involved in both venture capital and technology company boards of directors. PR was the chairman (1996-2002) and CEO (1996-2001) of Solid Information Technology, where he was instrumental in raising funds in excess of $60 million to build the company into a global player in mobile database market. Prior his tenure at Solid, PR held various senior executive positions at Digital Equipment Corporation from 1972 to 1994, including worldwide director of the Travel and Transportation Industry (1992 to 1994) and general manager for Finland (1972-1981 and 1983-1992). <br><br> PR is also a founding partner of Prime Technology Ventures, a Netherlands-based venture capital fund, where he currently serves as Senior Advisor. PR  holds master of science degrees in Physics from the University of Helsinki, and is a graduate of the Stanford Executive Program at Stanford University Graduate School of Business. |

**EXTRACT FROM THE INTERVIEW**

The question to the entrepreneurs is "Can Success Really Be Built?"

"The entrepreneurship is about: Talent..., Passion...  , Hard work..., Study..., Coaching..., Team..., Funding..."

"There are lot skills that are needed. Only partially we can list them as:
- Invention
- Innovation
- R&D
- Engineering
- Manufacturing
- Outsourcing
- Quality Control
- Intellectual Property
- Marketing
- Market research
- Competitor analysis

- Selling
- Listening
- Pricing
- Terms and conditions
- Marketing communications
- Incentives
- Internationalization
- Traveling
- Leadership
- Management
- Organizing
- Recruiting
- Team building
- Human relations
- Compensation
- Stock options
- Finance
- Administration
- Negotiations
- Contracts
- Logistics
- Customer care
- Real estate
- Investor relations
- Asset management
- Standards work
- Relocation
- Dreaming

"Business and personal connections and networks are important to opening doors, to providing models, to listening and learning as well as for continuous reality checks"

"Can success really be built? Absolutely yes. It requires significant changes. It also requires focus on winning, not just technology. It requires focus on know-how, not just money."

**Interview #5**

| Date of interview | November 18, 2004 |
|---|---|
| Place of interview | Smart House, Technopolis, Oulu, Finland |
| Duration: | 1  hrs |
| Interviewer: | Pekka Kess |
| Interviewee: | BF<br><br>Combining entrepreneurial agility and large-scale IT experience, BF has successfully built responsive, efficient and lasting Professional Services and IT teams that have provided outstanding service to customers, employees, suppliers, and investors.<br><br>BF has been an integral part of three high-tech management teams, which have raised over $200,000,000 in venture capital. She has held executive positions as CEO Global Connexus, CIO ReadRite, VP Application Services AristaSoft, VP Professional Service CompuCom, Director IT Safeguard Business Systems and Director IT Prime Minister Trudeau's office.<br>With skills honed over 18 years in the real world of high growth technology start ups, BF's greatest talents may be her ability to create organization out of chaos; her ability to envision the quantifiable goals and systems that will best serve the defined mission of an organization and to listen to the customer.<br><br>Prentice Hall recently published "CIO Wisdom", which she co-authored.<br><br>BF is a founding member and Executive Director of the Institute for the Design of Practices and Executive Director of Global Software US Team. |
| EXTRACT FROM THE INTERVIEW<br><br>The first argument of BF is that "If you want to grow you have to go to the Customer". The External expert can and should be used to do just this.<br><br><br>BF claims that the right thing is to "Research and find your right customers, partners, funding sources.<br><br>Her 9 key elements of market strategy are:<br><br>**Target Customer** - We identify a "beachhead" target customer segment in terms of | |

three constituencies - the economic buyer, the end user and the IT infrastructure.

**Compelling Reason to Buy** - The key to swift capture of the beachhead and expansion beyond it is to focus on a segment that has a "must have" requirement. The strategy will describe this need and explain how the product fulfills it in a uniquely advantaged way.

**Whole Product** - This describes the complete set of products and services, beyond the product itself, needed by the target customer in order to fulfill the compelling reason to buy.

**Partners and Allies** - For every component of the whole product that is not supplied, we identify one or more desired partners who will take responsibility for this aspect of the solution set.

**Whole Product Distribution** - The goal is to identify the distribution requirements of the target customer for being successful with the whole product and identify distribution organizations which can fulfill them.

**Competition** - What competitive products represent threats/opportunities? What buyer and/or category behavior and/or factors can aid or impede our progress?

**Positioning** - The above discussions lead to a positioning strategy that emphasizes our unique and sustainable advantages. This segment facilitates the development of targeted marketing communications and selling initiatives.

**Market Development** - What is the potential for the product/service to expand its appeal to other segments? Can we capture larger market segments through the effective deployment of our beachhead strategy?

**Interview #6**

| Date of interview | November 18, 2004 |
|---|---|
| Place of interview | Smart House, Technopolis, Oulu, Finland |
| Duration: | 2 hrs |
| Interviewer: | Pekka Kess |
| Interviewee: | VV has participated in the startup of 15 high-tech companies. Including Novel, Telerate and Compucom. Collectively, they have achieved more than $10,000,000,000 in stock market valuation. He is an advisor, lecturer and author. He is also the founding US partner of the Global Software programs sponsored by the Finnish Government and EU. In addition he is a founder of Global Connexus and Suominet organizations dedicated to biotech and wireless technology transfer from Finland to the USA.<br><br>VV is a member of the Board of Directors of Spanworks (a Toshiba joint venture), 21st Century Medicine, LifeSpan Genetics, Optogenetics, Global Aquatech, Biomarker Pharmaceuticals Genemicro, Global Mining and Critical Care Research. He is located in the heart of Silicon Valley.<br><br>VV holds degrees in Math and Electrical Engineering, Masters in Business and a PhD in Human Behavior. |

| **EXTRACT FROM THE INTERVIEW**<br><br>VV stressed the need to understand the trends that are 'in the air'. It is not only all that is obvious but also things that are known to only some experts that would be valuable. Especially VV raised the questions about digital convergence from the technical arena and the China phenomenon from the commercial arena. In both trends the knowledge (rich, many-sided) is of great importance and value for SME's.<br><br>VV questioned also the position of mid sized companies (in SW business). His belief was that SME's and large companies will have a role to play, but the mid size will suffer in the future.<br>VV quoted Lee Iacocca: "If you want to make good use of your time, you've got to know what's most important and then give it all you've got." To get to know what is important is good to use also external knowledge sources. |
|---|

**Interview #7**

| Date of interview | March 25, 2005 |
|---|---|
| Place of interview | Pekka Kess Oulu, Finland - Jack Savidge La Jolla, USA over Skype connection. |
| Duration: | 1 hrs |
| Interviewer: | Pekka Kess |
| Interviewee: | JS has over 30 years of experience as a CEO, Line Manager, Board Member and Consultant. JS is presently the President and CEO of his own consulting. His areas of expertise are Strategy, Technology Transfer, Corporate Internal Venturing and Equity Consulting. Some of JS's present and past clients include Motorola, AT&T, Gulf Oil, Warner Brothers, Lockheed, Merck, 3M, Mattel and Bank of America.<br><br>JS is a graduate of Lehigh and St. Lawrence Universities. |

**EXTRACT FROM THE INTERVIEW**

The basic assumption of JS is that an entrepreneur is:

- Urgent
- Energetic
- Skilled
- Independent
- Authoritarian
- Suspicious
- Charismatic
- Cash needy

**His idea of life cycles goes with three parameters of**

**1) business stage 2) physical stage and 3) mental stage:**

| | | |
|---|---|---|
| New Ideas | Crawling | Chaotic |
| 1st orders | Walking | Excitement |
| 2nd Orders | Youngster | Building Self |
| Many customers | Adolescence | Confidence |
| New offerings | Young adult | Growth |
| Market positions | Adulthood | Maturity |

| Climate changes | Older adult | Declining |
|---|---|---|
| Obsolete offerings | Aged | Death |

JS indicated some common SME attitudes as:

- I started it; I can and will continue to manage it!
- My business problems are solely my business!
- My business is not the business of outsiders!
- Educating outsiders takes too much of my time, which I do not have!
- By trial and error, maybe I can make it!

JS argues that this type of attitudes is causing on the entrepreneur:

- Inefficiency
- Misdirected energy and money
- Missed market opportunity
- Lowered employee morale
- Investor impatience
- Lower future profits
- Lots of stress, on me and my family

His question is if it would be possible to:

- Who to hire, who to let go
- Delegating to those who really can do it
- Having no time because I do everything
- Paying bills, finding more money somehow
- Feeling indecisive, unsure of major decisions
- To move forward, I must learns new ways
- Having to justify, that my business comes 1st!

From original definition of Mentor, Coach, Guru and Angel JS has made a small change by talking about Expert instead of a guru. He gave examples like:

- for foreign market facts - an Expert
- for sales training - a Coach
- for inventory capital - an Angel
- for export customs help - an Expert
- for help selecting a Board - a Mentor
- for increasing parts output – a Coach

He reminds that each of those are different

- In expertise they have
- In how they work

- In what motivates them
- In why they are valuable
- In when they are useful
- In how you compensate them

**A Mentor** is according to JS:

- Older but not too old
- A patient listener
- Sensitive to your fears
- Impartial and realistic
- Insightful Yielding not demanding
- A direct talker
- Eager to understand
- Available to confer
- One to be trusted
- Transitional as needed
- Non-judgmental
- Common sensed Not theoretical
- Knows how SME's grow
- Illuminating and reflecting
- Suggesting, not telling

**The Coach** is according to JS

- Is: engaging, inquisitive, open, professional and urgent
- Wants: instructions followed, trainee time used efficiently
- Needs: to get it done and leave with everyone pleased with the work

**The Expert** is according to JS

- Responds best to direct, clear data needs
- Probes for most important questions
- Only reflects "real world" conditions
- Reports un-biased findings
- Will not change results to suit Managing Dir.
- Believes answering a critical question has equal value, whether it takes a minute, day, week or month to provide it.

**The Angel** is according to JS

- Banker – risky number based loaner
- Private Investor – bets for high return
- VC – patient money pro
- Customer/ supplier – barter funding
- Family member or a friend – word angel
- Government – grant and contract money

- Wants loaned money returned with interest
- Expects SME Board to be prudent-diligent
- Demands timely reports and payments
- Operates like a financial partner
- Enjoys attending major company events
- Brings expertise along with money
- Urges more urgency

To the question, where one can find these external knowledge owners JS ha the answer:

**Mentors**

Not friends or family!

Older SME Managing Directors

Favorite relevant professors or teachers

Someone in business excited by your vision

Should not be more than 20 years older than you!

**Coaches**

Suggested by suppliers and their references

Firms specializing in training

Referrals from other Managing Directors

Should only be 10-15 years older than the average age of people to be trained

**Experts**

Referrals by executives within your industry

Professional and trade magazine authors

University researchers in your field

Industry directories, supplier-customer referrals

**Angels**

Retired Chairman of successful firms in your markets

Heirs of old family and newly gained fortunes

Owners or Corporate Development Depts. of major suppliers or customers

The 2nd or 3rd largest bank in your locality

National Govt. and EC grant/contract postings

Venture Capital Firm Listings

**Appendix F**
Data analysis of the research validation

**Data analysis of the research validation**

**Appendix Table 2**  Experience from the external knowledge (Company 1)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| COACH – process analysis and improvement | Less waste Better utilization of the HR Knowledge base building | Mature | Even the company has the knowledge what to do – it was better to hire a coach to help |
| GURU – product know how | Improved sales | Mature | The company is dependent on bringing new products frequently i.e continuously– it needs a guru to tell where the world is going and what knowledge is needed |
| ANGEL – The European Union funding gives great benefits for growth | New funding and partnership potentials | Mature | The company has experience of both national and EU funding mechanisms. These do change continuously and it is better to utilize the latest know-how to achieve the best benefits |

**Appendix Table 3**  Company planning to use external knowledge in the future
(Company 1)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
| --- | --- | --- | --- |
| GURU – product know how | Improved sales | Mature / before decline | The company is dependents in bringing new products frequently – it needs a guru to tell where the world is going and what knowledge is needed |
| COACH | The internal porcesses require continuous improvement. | Renewal | The company is in financial problems and has changed the CEO just recently. The new CEO likes to use external expert instead of a biased internal knowledge |

**Appendix Table 4**  Experience from the external knowledge (Company 2)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
| --- | --- | --- | --- |
| GURU – product know how | Get new products and increase sales: in moving from fixed code ROM memories to EEPROM memories extending the potential number of applications | Start-up | The micro electronics technology is very fast developing and requires a lot of expertise and investments with rather short life cycles – using external expertise is the only was a small and medium size company can survive. |
| GURU – production know how | Various packaging technologies gave the possibility to look for new markets. | Start-up | See above. In addition to products it applies to production technologies as well. |
| ANGEL – Venture Capital | Only external funding made it possible to grow | Start-up | To 'play' with various funding mechanisms in Finland: joint ventures, TEKES, EU etc again requires expertise that a small company can not maintain |

**Appendix Table 4**  (Continued)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Angel - Government R&D funding | The Government R&D funding (TEKES) made it possible to carry out an extensive technology transfer project from the US to Finland and further to customers in Japan and Germany | Start-up | see above |
| GURU - Accounting | Save resources to the core business | Start-up | The whole accounting was outsourced |
| GURU - HRM | Save resources to the core business | Start-up | Especially help in analyzing the applicants to new openings was outsourced. |
| Mentor | Some of the 'silly' mistakes were avoided | Start-up | The key directors of the board acted as mentors to the MD. |

**Appendix Table 5**  Company planning to use external knowledge in the future (Company 2)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
| --- | --- | --- | --- |
| Mentor | To speed-up the growth | Growth | A mentor can help the management to make strategic selections in a more rational than emotional way. The stakes mentor has in the company are weaker that those of the management. |
| Guru | New products for new applications | Growth | It has taken some 20 years to the technology in question to matter enough for real mass markets. The guru can help with analysis of the various applications. |

**Appendix Table 6** Experience from the external knowledge (Company 3)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru | To define the intitial product(s) | Start-up | The company is in a hurry to get the first clients. The first income comes from consulting where the know-how the company sells is actually know-how from the individuals and not from the company. In the beginning it is very important to define the product of the COMPANY. |
| Politician | Access to market The get quicker the purchase decisions from the clients. | Start-up | The main customers are expected to in the public sector organisations where the purchasing decisions are made in a process where both professional and political decision making is taking place. It is important to manage both sides. |

**Appendix Table 7**  Company planning to use external knowledge in the future
(Company 3)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru | To build a deeper 'scientific' base for the products and the to the company at the same time | Start-up – $2^{nd}$ phase | |
| Politician | To keep the customers | Growth | The challenge with public organisations is that the politics will change after every election. The company has to maintain good relations which ever party is ruling and who ever is in charge. |

**Appendix Table 8**  Experience from the external knowledge (Company 4)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Angel – funding for product and process development | To keep the people working for the company | Start-up | The company is in bio-tech business and the start-up phase has taken awfully long time |
| Angel – EU funding in collaboration with technology developer and customer | Gave directions to product development as well. Moved resources from not so potential business areas to more potential | Start-up | |
| GURU – fiber technology, enzymes technology, composite materials | Good product with distinctive properties – probably unique enough to get patents | Start-up | |
| Politician to get support from the local municipality | Was part of the production development and partly just to keep the entrepreneur alive | Start-up | |

**Appendix Table 9**  Company planning to use external knowledge in the future

(Company 4)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Mentor – business planning | With their own resources to company is capable to redraw the future plans a mentor should help | Growth | Maybe the entrepreneur is not prepared to adapt new ideas from a mentor and is too stubborn too the changes that are really needed. |
| Angel – new VC funding | Without significant injection of new money with some business mentoring  the company will go bankrupt, | Growth | |

**Appendix Table 10**  Experience from the external knowledge (Company 5)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Mentor – for business planning | The company was started only after the mentor was 'on board'. | Start-up | |
| Politician – to get the local funding for the company | The company used the village mayor to do the politicking. | Start-up | |
| Politician to get room for the offices at a reasonable cost. | The company used the village mayor to do the politicking. | Start-up | |
| Guru to get sufficient technology know-how to the core business | With external help questions like Networks, Network security, Network services were taken very quickly into business level, | Start-up | |
| Angel – financial systems expertise | The usage of an external financial advisor helped to get the financial system right from the very beginning | Start-up | |

**Appendix Table 11**  Company planning to use external knowledge in the future (Company 5)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru – latest development in ITC | The business success depends how well to company can maintain the sufficient technical know how level, With the help from external experts it is possible. | Growth | |
| Coach – quality system development | Quality systems brings:<br>• customer loyalty – (important in B2B business)<br>• cost savings by reducing quality costs<br>• new customers | Growth | |

**Appendix Table 12**  Experience from the external knowledge (Company 6)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Coach – risk management | In the times of business change the risk management should be well balanced. The benefits are in better management, more effective change processes, and better results from changes. | Mature looking for renewal | |
| Angel | Improved financial processes | Mature looking for renewal | |

**Appendix Table 13**  Company planning to use external knowledge in the future
(Company 6)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Mentor – experienced board member | The board will be guiding the renewal process and the old members are not most suitable | Growing - renewing | |
| Coach – production management | Profitability potential is very large | Growing - looking for renewal | |
| Angel – financial know how | The level of financial know-how must be improved. Gives room to expand in profitable business areas and to shut down businesses that are not profitable (enough) | Growing - looking for renewal | |
| Mentor – business planning | The business planning will be based on the new visions of significantly different business compared to the existing | Growing - looking for renewal | |

**Appendix Table 14** Experience from the external knowledge (Company 7)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru – expertise on the environmental issues | Better results in: <br>• defining the right products <br>• understanding the markets and their developments <br>• understanding with who to partner | Start-up | The company has been able to build a pilot system with one customer (a friend?). This might however quite different to the customers in the real market. |
| Angel – funding for product development | Quicker product development phase <br> Better product – more features | Start-up | |
| Mentor – to help to run the business | Engineering (young technicians) driven company benefits a lot from an experienced business manager/director who has gone through all life cycles of a business. | Start-up | |

**Appendix Table 15**  Company planning to use external knowledge in the future
(Company 7)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Mentor – business development | Keeping the business on right track. Sustainable growth. | Growth | |
| Guru – product development, production machinery development | The products must be improved continuously and with many aspects: chemistry, materials, (Electricity, Heat, Ventilation & Air Conditioning - EHVAC) it makes sense to use external expertise when available | Growth | |

**Appendix Table 16**  Experience from the external knowledge (Company 8)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru – product development to integrate the new product to existing system infratrusture | With this arrangement the new products could be easier to be sold to 'old customers'. | Start-up | New product to old customers is much easier than new products to new customers. |
| Angel – product development funding from TEKES | To get results quicker from the product development  process. Can use better (=more expensive) experts for product development | Start-up | |
| Mentor (politician?) to manage network where the business is done | Better networking for production, product development, marketing, market knowledge | start-up | |

**Appendix Table 17**  Company planning to use external knowledge in the future (Company 8)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Mentor to continue to manage the business | Better networking for production, product development, marketing, market knowledge | Growth | |

**Appendix Table 18**  Experience from the external knowledge (Company 9)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Angel – funding for R&D | To speed up the product development and commercialization of the product concept and the products | Idea / start up | |
| GURU – technological expertise in various field needed for the integrated product | To use the latest technologies and to know the new developments is essential for the success | Idea / start up | |

**Appendix Table 19** Company planning to use external knowledge in the future (Company 9)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Coach – US marketing | To challenge the biggest possible market | Start-up | |
| Angel – product development funding from TEKES | To get results quicker from the product development process. Can use better (=more expensive) experts for product development | Start-up | |
| Mentor (politician?) to manage network where the business is done | Better networking for production, product development, marketing, market knowledge | Start-up | |

**Appendix Table 20** Experience from the external knowledge (Company 10)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru – product development to integrate the new product to existing offerings of various potential partners | With this arrangement the new products could be easier sold to 'old customers'. | Start-up | New product to new customers is difficult the company (=entrepreneur) is not afraid of the challenges that will be another path too. |

**Appendix Table 21**  Company planning to use external knowledge in the future
(Company 10)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Angel – funding for R&D | To speed up the product development and commercialization of the product concept and the products | start up | |
| GURU – technological expertise in various field needed for the integrated product | To use the latest technologies and to know the new developments is essential for the success | start up | |
| GURU – market knowledge from exotic locations | To be first in a totally new market area brings potential success opportunities but also risks. To manage risk and to guarantee a good market entry external experts are used. | growth | |

**Appendix Table 22**  Experience from the external knowledge (Company 11)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru – technical espert is used to test the perfomance of the products | To get a 'quality label' for the products | Renewal | The 30 years old company is changing the whole product line. At the same time it has changed even the name. |
| GURU – technological expertise to make a much better than the competitors | New products and sales growth | Growth | |
| GURU – market know how | To eneter new markets | Growth | |
| Politician – to get the rules and regulations harder – gives the company better competitive advantage | Using new standards some old companies might not be able to meet the new demands. Helps in competition | Growth | |
| Angel – to get funding for product and production development | Faster process to get new products into production | Growth | |

**Appendix Table 23**  Company planning to use external knowledge in the future
(Company 11)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Angel – to get funding for product and production development | Faster process to get new products into production | Growth | |
| GURU – market know how | To eneter new markets | Growth | |
| Politician – to get the public organizations to buy these new products | New customers from the public sector -> growth in sales. | Growth | |

**Appendix Table 24**  Experience from the external knowledge (Company 12)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru – to improve the production technology | Reduction in production costs. The production is rather labor intensive and to reduce the cost more automation is needed | Mature | The production has a long history even the company is only 5 years old. |
| Angel – to get funding for the product development | To speed up the coast saving investments in production | Growth | |

**Appendix Table 25** Company planning to use external knowledge in the future (Company 12)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Angel – to get funding for the product development | To speed up the coast saving investments in production | Growth | |

**Appendix Table 26** Experience from the external knowledge (Company 13)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Gurus – mechanical, electrical and IT design | The company gets the latest design know how to its use. The experts use latest CAD systems and know the latest developments in materials -> faster design throughput, better product designs, and faster design. Electronics and IT design are needed frequently but not continuously. | Mature | The company lives through very heavy economical cycles and is willing also to keep the workforce as low as possible and utilizes external experts when possible. Even the products are 'heavy mechanical' they include more and more electronics and IT. |
| Coach – risk management | When company is dependent on external knowledge is advisable to have a good risk management practice. | Mature | |

**Appendix Table 26**  (Continued)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Artist | Every now and then and industrial designer – an artist is needed to design parts of the product. | Mature | |

**Appendix Table 27**  Company planning to use external knowledge in the future (Company 13)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru – mechanical, electrical and IT design | The company continues to use the modern design methods through external experts. | Mature / tough competition | |
| Artist | More often an artist is needed to design parts of the product – and maybe in the future the complete product. | Mature / fierce competition | |

**Appendix Table 28**  Experience from the external knowledge (Company 14)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru – to analyse and plan improvements to the materials management | Through better materials management the Work-In-Process (WIP) will be reduced | Growth/ mature | This is going on currently (in 2007) |
| Guru – to find correct subcontractors for certain work | Some of the bottlenecks will be removed by using subcontractor. This will increase the capacity of the production system without investments. | Growth/ mature | This is going on currently (in 2007) |

**Appendix Table 29**  Company planning to use external knowledge in the future (Company 14)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru – Market and sales | To get new market segments. | Growth/Matrure | |

**Appendix Table 30**  Experience from the external knowledge (Company 15)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Mentor – how to run business | The mentor was essentail help on starting the business | Idea | The entrepreneurs were very young and inexperienced – but highly motivated and very energetic. This gave a good ground for a fruitful mentor-actor relationship |
| Angel – how to get initial funding | Helped the business to start at right time for the first season | Idea | |
| Angel /Coach – how to make cos accounting | This helped a lot in making a realistic ramp-up, with very small initial investment | Start-up | |
| Guru – product know-how | To have right products to meet the actual demand | Start-up / Growth | The restaurant supplied various products and the clientele varied through the day: day time were the families and in the evenings the youngsters |

**Appendix Table 30** (Continued)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Coach – process knowhow. | Helped to optimize the labor force from the very beginning – not much and too little. The result was a nice profit from the very first period of operations. | Start-up - Growth | To serve food products the company has to meet laws and regulatiosn regarding saftey and health at job. Also the selling of alcoholic drinks is strongly regulated and requires certain defined ptocedures by laws and regulations. |
| Guru – to build partnerships with various stakeholders to improve sales | Increase of number of customers because of many joint marketing activities with other local actors (sport and music events, etc. ) | Growth | Networking was learned by the entrepreneurs at very early stages. Also sharing the results was learned, which was a bit difficult, but receiving 80 % from large sales is much better than receiving 100 % from a much smaller sales. |

**Appendix Table 30**  (Continued)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Politician – to work with the local authorities to have good image, good business conditions | The business was dependent very much on the 'image' which was partly built by local public organisations. Also the terms of the rent of the premises was purely based on the city authorities. | Throughout the history of the company | The city internal politics caused some problems also. The politics cannot be managed 'totally'. |

**Appendix Table 31**  Company planning to use external knowledge in the future (Company 15)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Politician | To ensure the continuation of the business | Maturity – renewal | |
| Guru – to get new products i.e. new ways to serve the customers | The renewal of the product portfolio is important (even to McDonald's) | Maturity – renewal | |

**Appendix Table 32**  Experience from the external knowledge (Company 16)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru – to create new products with higher value | To increase the turnover without increasing the volume on materials | Mature | |
| Guru – to maintain the food quality production (GMP) | To stay in business | Mature | |

**Appendix Table 33**  Company planning to use external knowledge in the future (Company 16)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Angel – to organize funding for product and production development | To increase the turnover by adding value to the products. To increase the yield. | Mature | |

**Appendix Table 34**  Experience from the external knowledge (Company 17)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Coach | Marketing for new clients, presentation of new services to existing and potential clients | Start and Growth | Hiring a few people (considered to be a coach) as full-time staffs on the annual contract |
| Guru | Developing new ideas for better service portfolio (in the future, planning to conduct customer interviews for HR improvement, HR audits, manpower planning for service operations, customer delight thru knowledge management) | Growth | I happed to be considered as a guru according to this interview.  There were a few friends of them who were thought to be gurus as well. |

**Appendix Table 35**  Company planning to use external knowledge in the future
(Company 17)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru | Developing new ideas for better service portfolio | Growth | |
| Angel | They are looking for new investors or shareholders for needed cash | Growth | Many young staffs may leave without longer-term contract.  Right now, annual contracts remain due to the clients' contract (signed on the annual basis as well) |

**Appendix Table 36**  Experience from the external knowledge (Company 18)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Mentor | Overall market potential and possibility, connection with potential client, competition, etc. | Idea at the beginning of a company and at the decision to shift into new industry sector | Elder business partner (eventually became a shareholder) |

**Appendix Table 36**  (Continued)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Coach | Marketing, customer relation, supplier management, IT applications, labor relation, and technical knowledge that is complimentary to production, ISO 9001: 2000, QS 9000, etc. | Growth and Competition of an organization (including new product when shifting into the automotive industry | Managing director's background is engineering.  He has a dual degree in mechanical and production engineering.  He is also managing production (an essential unit). |
| Guru | IT applications (linking production/ operation and accounting) | Growth and Competition (when a company needs better control) | Project-based contracts, including university professors |
| Father | Only advice on how to handle personnel-related issues in production such as drug or alcohol use, how to deal with workers who come to work late, how to praise workers, how to select and promote workers  (not involving directly with a company's affairs) | Idea, Start, Growth and Competition | Worker-related issues have happened when a company started its operations. |

**Appendix Table 37** Experience from the external knowledge (Company 19)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Mentor | Overall future demand, market possibility, consumer patterns, competition, etc. | Idea | Use throughout the time the company has been in the business, especially during new product development |
| Coach | Production processes, production planning, technical inspection of products and equipment, (to comply with hygienic requirements), packaging, applications of new technology such as ERP, SAP (for accounting control), other management aspects such as quality, industrial relation, customer relation, labor relation, productivity, etc. | Growth and Competition | He recalled using these external experts somewhat during the company start-up as well as when it had launched new products. Otherwise, he considered consultants as well as coordinators from customers in Japan to be coaches. The terms growth and competition are for both products and his organization. |
| Guru | R&D, food formulas (based on new products such as buns, etc.), and customer sampling for needs and demands | Start (for new products) and through the company's life cycle | Project-based contracts or part-time hire |

**Appendix Table 37**  (Continued)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Father | Confidence in the company strategies as well as new ventures and new product development—morale of management and staffs (have been used in the past for story-telling to motivate workers when the company struggled to be in the business) | Start of new product and during high competition of the company | |

**Appendix Table 38**  Company planning to use external knowledge in the future
(Company 19)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Mentor | Overall future market and new business ventures such as spin-off units | Idea | During new product development |
| Coach | Continuous improvement in operational processes and strategic planning, including business takeover, outsourcing, relocation of production to other countries such as Vietnam, etc. | Growth and Competition | Need for an organization as well as when new products begin to take a foothold in the market |

**Appendix Table 38**  (Continued)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Guru | R&D for new product development | Start for new product (but in the context of organizational life-cycle, it would be competition | Probably need to hire international personnel from the targeted market |

**Appendix Table 39**  Experience from the external knowledge (Company 20)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Mentor | Overall future demand, market possibility, consumer patterns (such as buying frozen foods to cook at home for breakfast and dinner), etc. | Idea | Family connection so a gift was presented |
| Coach | Production processes, technical inspection (to comply with hygienic requirements), packaging, etc. | Start | Hiring as a full-time staff |
| Guru | Taste, food texture, sauce, consumer preference, R&D, etc | Start | Project-based contract |

**Appendix Table 40**  Company planning to use external knowledge in the future
(Company 20)

| Types of external knowledge | Benefits to the company | At what stage | Remarks |
|---|---|---|---|
| Angel | Financial management, investment, management consultant (especially on quality, productivity, environmental, IT, accounting, ergonomics for GMP), etc. | Growth (for market expansion into other countries or other retails in Japanese markets) | Probably will be in terms of project-based contracts and full-time advisors |
| Politicians | Forming an association for lobbying as well as influencing governmental policies due to globalization and free trades | Growth | As a result of joining business associations such as Federation of Thai Industries |

**Appendix G**
Case descriptions and analysis of the research validation

**Case descriptions and analysis of the research validation**

**Case Company 1**

The Case Company 1 specializes in readers, reader modules, cards and tags based on various proximity, smart card and UHF technologies. The company was founded in 1989 and is therefore one of the oldest companies in its field in the world. Currently the company is owned by Venture Capital company and the operating management.

The company products are intended for applications with special requirements on security, functionality and elegant design. The company offers:

- Innovative access control readers to distributors and system integrators
- Tailored RFID products for various identification applications to our
- value added partners
- Innovative passive UHF products for several application areas

The company offers a complete product line for various access control and ticketing applications from the lowest to the very highest end. The product alternatives range from lower priced 125 kHz technology readers to 13.56 MHz multi-technology readers and special readers with sector reading and read/write functions.

The company readers are used in various logistics, factory automation or asset marking applications. The intrinsically safe products meet the requirements that are placed on products used in intrinsically safe areas, like oil refineries, petrochemical plants, paint shops etc. as well as in distribution of oil and gasoline.

The company offers a wide range of RFID tags and cards for various applications. The tags are available as cards, epoxy laminated coin tags, robust epoxy-potted tags or key ring tags for both indoor and outdoor use.

In the next paragraph a concentrated assessment of the external knowledge sources are described. Majority of the sources are national i.e. from the same country as the company itself. But some external knowledge from abroad was utilized as well. On those cases the country of origin will be mentioned. The evaluation is based on the first three phases of the development i.e. idea, start-up and growth. After this period the company still meets the definition of an SME.

**The idea phase of the company**

The idea of the company was created at a transportation technology division of a large steel company in times when:

- information technology was seen as a great opportunity for new business solutions
- old and traditional companies looked for new business opportunities in synergic areas and they had some resources for funding new venture
- Venture capital landed in Finland.

The division in the steel company acquired (external) knowledge for

- New strategies
  - o strategic thinking from a former director from NOKIA Corp.
  - o Strategic process know how from SAMI consulting
- Business planning from Teknoventure Oy
- Venture funding from Teknoventure Oy
- IT technology from corporate internal sources
- Market know how from Mikrolog GmbH (Germany) who had some experiences in the intended business sector
- Micro electronics from Brooktree Corp. (USA) designing and manufacturing IC's.

- legal issues from the corporate internal sources as well as some expertise in two major potential business areas: USA and Germany.

Based on the collective body of knowledge about

- the products
- the technologies
- the markets
- the competitors
- the funding possibilities
- the possible company structure
- the possibility to hire a right management team

A business plan was prepared and the company started as a joint venture between the steel company and the VC company.

**The start-up phase of the company**

For product development the company used

- The State Technical Research Center (VTT) to development correct type of packaging
- Fincitec Oy to the ASIC design and testing
- Brooktree Corporation (USA) to the systems design in addition to the ASIC design
- NCR (USA) to the IC manufacturing
- Pepperl & Fuchs Gmbh (Germany) to the systems design. P&F was granted a limited license to sell the products in Germany as a trade-off.
- Omron Electronics (Japan) to the systems design. Omron was granted a limited license to sell the products in Japan as a trade-off.
- Buscom Oy to develop products for passenger ticketing

For production development the company used

- Aspocomp Oy for the manufacture of circuit boards
- Tekniseri Oy for lamination of RFID tags

For marketing as well as market analysis and development the company used

- Taucher Oy for image building
- Cambridge Consulting Group (The UK) for market and product analysis
- group of sales agents and distributors in Europe and in the US to better understand the markets, customer needs and product features.

For funding and funding expertise the company used

- The Venture Capital Company (Teknoventure Oy) for raising funds
- The State Technology Development Center (TEKES) to fund the product and production development as well as some technology transfer from the US to Finland
- SITRA Foundation to arrange operational capital.

For the legislation, agreements and similar expertise the company used

- lawyers from the parent company
- lawyer from the US

For the recruiting and other HRM tasks consultants were used for instance to

- analyze the applicants to the new jobs
- create a HR policy for the company
- supply the basic services (health care etc)

**The growth phase of the company**

For product development the company continued to use

- Fincitec Oy to the ASIC design and testing
- NCR (USA) to the IC manufacturing
- Pepperl & Fuchs Gmbh (Germany) to the systems design. P&F was granted a limited license to sell the products in Germany as a trade-off.
- Omron Electronics (Japan) to the systems design. Omron was granted a limited license to sell the products in Japan as a trade-off.
- Buscom Oy to develop products for passenger ticketing
- JOT Automation to develop industrial automation products

For production development the company continued to use

- Aspocomp Oy for the manufacture of circuit boards

For the marketing as well as market analysis and development the company continued to use

- Taucher Oy for image building
- Professional Societies
- group of sales agents and distributors in Europe and in the US to better understand the markets, customer needs and product features.

For funding and funding expertise the company continued to use

- The Venture Capital Company (Teknoventure Oy) for raising funds
- The State Technology Development Center (TEKES) to fund new product development and second source manufacturing development

For the legislation, agreements and similar expertise the company used

- lawyers from the parent company
- lawyer from the US

For quality systems (ISO 9000) development the company used

- joint projects with the parent company

The benefits from the usage of external knowledge are evident:

- the company initially was established based on external knowledge about
  o the technology
  o the potential markets
  o the funding potentials
- the speed in product development was possible only with the usage of external knowledge. It made possible 'quickly' launch the first commercial product and to ensure the product renewal at a pace matching with the competition.
- the reasonable fast ramp-up of production of individual IC's as well as complete integrated systems was possible only because of the usage of the external experts.

**Case Company 2**

The case company 2 provides high quality services and latest know-how to all IT, network and data administration solutions. The company provides the following product lines:

1. Maintenance services – own IT-support person as externalized service. The company takes care of all systems, equipments and software's daily maintenance routines. The company also takes actions to error and other problem situations without separate assignment. Maintenance contracts are always designed with customer, to meet customer's requirements perfectly.

2. NetworkRadar – The Company analyses the client's network's condition and functioning and on grounds of results the company gives advice, how to improve the network. Main aspects in the analysis are high security in network, functioning and economical performance in long term.

3. Kerio e-mail service is unique, easy to use and reliable e-mail service in one packet. Kerio mail provides high quality support, reliability backup features. It offers wide range of features, designed to meet the customer requirements.

4. Windows 2000/2003 projects. The company offers solutions to Windows 2000/2003 environment so that the customer can exploit all features that it has already paid for.

5. Consultant and training services – The Company provides consultant services, for example comprehensive and professional project management, planning services and expert services to management group.

**The idea phase of the company**

The idea of the company was created at two small software companies who had problems

1. in hiring new people because of the strong boom in software industry small companies had great difficulties in competing with the larger ones

2. in getting venture funding because all companies were growing and needed extra funding for growth. Older companies had good track records and therefore it was easier for them to guarantee funding from various sources.

The companies started to look opportunities to start SW in the areas outside of cities. They located smaller places close enough to the city from to business point of view but far enough to have a different approach to the human resources. They were able to identify two locations, both about 100 km from the parent companies. In the first location one company decided to set up an office and in the second one the companies established a totally new company.

**The start-up phase of the company**

For establishing the company the founding companies used

- A business mentor to build the business structure and to help making the business planning.
- A person – politician - to understand the local politics to get the municipality to stand security on bank loans
- A person – politician – to get the municipality to arrange suitable premises for the office
- A person – politician – to get the public organizations to redirect their software service acquisitions to the new company.

For product development the company used

- A software expert to define the products and service
- The parent companies to define the product development process

For the service delivery (production) development the company used

- A software expert
- A business process expert

For marketing as well as market analysis and development the company used

- An experienced business mentor with background from software industry

For funding and funding expertise the company used

- Bank loans from the local 'village bank' with security from the municipality
- Financial practices (book keeping, accounting) the company used external accounting company

**The growth phase of the company**

For product development the company continued to use

- The software expert to further define the products and service with better specifications to various needs of old and potential new customers
- The parent company (at that time one of the two founding companies had sold its shares to the other one, i.e. the company had one SW company and the management as shareholders) to define the product development process
- SW and HW vendors were used to define new ways to service clients far in the rural areas where the larger SW and HW suppliers did not have presence.
- a EU funded project was used to further develop the services.

For production development the company continued

- TQM consultant to help to draw the first version of the quality manual for the company

For funding and funding expertise the company continued to use

- the local bank
- the accounting company

The benefits from the usage of external knowledge are evident:

- the company initially was established based on external knowledge about
  o SW business
  o possibilities to collaborate with a municipality in starting business
  o the funding potentials
- the speed in product development was possible only with the usage of external knowledge. It made possible immediately to start delivering services to the local customers in addition to the parent company

In addition to the knowledge the external expert – the Mentor – brought the company some credibility among customers, suppliers, partners and funding organizations which made it possible to build a sustainable business. In comparison the other unit that was established around same time, around at same distance from the parent company and with about same product and production concept the case company has grown slowly, it has a good financial track record and the future looks promising. The other unit has been closed.

# CURRICULUM VITAE

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