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THE LIFE CYCLE OF BOTTOM-UP IDEAS

Case studies of the companies where the simulation game method was applied

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Dissertation for the degree of Doctor of Technology to be presented with due permission for public examination and debate at Spektri in the Luna Auditorium at the Helsinki University of Technology (Espoo, Finland) on the 19th of April, 2002 at 12 o'clock noon.

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Omistan työni
luovuuden voimalle, hulluille ideoille,
toteuttamisen tuskalle, loppuunsaattamisen riemulle
ja loppumattomalle tiedon janolle,
sekä ennen kaikkea
pojilleni Rikolle ja Jerolle,
jotka tietämättään opettaneet
minulle kaikesta tästä niin paljon.

I dedicate this work to
the power of creativity, crazy ideas,
the torture of implementation, euphoria of completion,
and the endless thirst for knowledge,
but most of all
to my sons Jero and Riko,
who have taught me unknowingly
so much about these matters.

Abstract

The main aim of this thesis is to study the life cycle of the incremental "bottom-up" ideas, which concern process and organizational matters. According to earlier studies, bottom-up ideas are not always successfully used and managed and as well there exists need for more study on organizational and process innovations. It is therefore useful to study this phenomenon more and gain more information about how organizations manage the development and implementation of these bottom-up ideas.

The three main research questions are thus: How is the lifecycle of bottom-up ideas managed in organizations? Bottom-up ideas are the ideas that emerge from the shop floor and those of the foremen. Secondly, what factors enable or disable the life cycle and the implementation of bottom-up ideas? This thesis focused on the organization's internal factors. Thirdly, how has the participative simulation game method been used in the life cycle of "bottom-up" ideas and what has been achieved?

The thesis is based on data reported in detail in four studies that are related to each other. It follows the theory-building approach, instead of the "mainstream" theory-testing approach. The data includes 33 cases, i.e., separate training and organization development projects done in 17 companies. The main methods for collecting data are interviews and questionnaires. In all of these projects (cases), the simulation game method was used as a participative training and development tool, altogether 90 times.

To manage the complex, social, context-sensitive, life cycle of bottom-up ideas successfully, this study proposes the following conclusions. Organizations seem to be lacking the holistic management of bottom-up organizational and process ideas. To ensure the *holistic understanding of the management process of the "bottom-up" ideas,* it should be understood that the life cycle includes three sub-processes: the creativity process, the innovation process, and finally, the evaluation process in which management seems to be very poor in organizations.

This thesis shows that ideas should be categorized and their life cycles managed slightly differently *in terms of the scope: 1) "one-unit" ideas, and 2) "inter-unit" ideas*. It suggests that the life cycle of "inter-unit" ideas needs to have more supportive structures and tools.

This thesis produced new knowledge about *organizational and individual factors affecting the life cycle of bottom-up ideas*. It emphasizes the essence of the structures, communication as well as active organizational members and managers with good leadership skills as one of the most critical factors. The results show the phase-specific disabling factors, the roles of organizational and individual factors in different phases of the life cycle of ideas, as well as the disabling and enabling factors of the life cycle of "one-unit" and "inter-unit" ideas.

The successful use of the bottom-up ideas needs to have a *supporting organizational development culture.* It is essential to understand the underlying critical organizational and individual factors of organizational development culture and sub-cultures *at least at the management level.* Because an innovation process is always a social process, managers should have supportive experimental methods to improve individual capability in handling interpersonal relations and to deal with conflict between people and within oneself.

The social simulation game is a participative, tailored developmental and training tool, which *enables the life cycle of ideas*. The method seems to enable the life cycle of "inter-unit" ideas improving the requirements for creativity and successful implementation. In addition, the simulation game improves mutual understanding and communication, which *can effect the development culture* as well as its artifacts, values, and assumptions.

Dissertation

This dissertation includes an extended summary and four appended papers. Within the text, each will be referred to with Roman numerals.

Studies:

Study I:
Forssén-Nyberg, M. & Hakamäki, J., (1998) Development of the production using participative simulation games - two case studies. *International Journal of Production Economics,* Vol. 56-57. 169-178.

Study II:
Forssén-Nyberg, M. and Kutilainen, P. (1998) Participative simulation game as facilitator of organizational development process - two case studies. In: R. Smeds and J. O. Riis (Eds.) *Experimental Learning in Production Management*. London: Chapman & Hall. 39-49.

Study III:
Forssén, M. & Haho, P. (2001) Participative Development and Training of Business Processes in Industry - Review of 88 Simulation Games. *International Journal of Technology Management,* Vol. 22, No 1/2/3. 233-262.

Study IV:
Forssén, M. (2001) Life Cycles of Organizational Bottom-up Development Ideas. *Knowledge and Process Management,* Vol. 8, No 4. 249-261.

Grateful thoughts after finishing the writing process

I have done this doctoral study at the Helsinki University of Technology, in the department of Industrial Engineering and Management. My professor Veikko Teikari has provide me with a supportive atmosphere and freedom to work and develop myself as life has demanded at each moment – I express my sincere gratitude to you, Veksi.

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Prof. Matti Vartiainen first supervised my licentiate thesis and now my doctoral thesis as well. He is the one who actually led me to the world of academic writing and tutored me on the way. For you, it has been a quite the task, and I really want to thank you for your patience, approving attitude and the way you sat down and worked with my thesis whenever I requested it.

The two preliminary examiners, prof. Martin Lindell and Dr. Mika Aaltonen, have both given me positive comments as well as very good constructive criticism that has improved this thesis to pass as a dissertation. I greatly appreciate your investment in time and effort.

I had the great pleasure to write three papers included in this thesis with my (ex)colleagues and friends Päivi Haho, Päivi Kutilainen, and Jussi Hakamäki. I have really enjoyed working with you. Päivi Haho in particular is probably the one how knows best the ups and downs of my writing process and I want to thank you so much for sharing all that with me.

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The everyday life in the doctoral process is much more than just writing, analyzing data and making amazing findings. It is dealing with obtuse questions and problems with computers and networks; copying articles and ordering new ones; learning to use article databases, finding the right office supplies when needed, and noticing how much the books are late back to the library…once again… Many people from our administrative staff have so kindly assisted me with numerous small problems, and I really appreciate your cooperation and kindness. However, the persons who have been especially indispensable in helping for me to survive these tasks are Jaana Vuopala and Leena Mellavuo from our library, as well as Kari Koskinen from technical support. I give you all a big hug.

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As an action researcher, I have had the opportunity to work with many different organizations on organizational development projects. The initial ideas for the focus of this thesis were actually formed in discussions with people from the companies. I owe much gratitude to these people and these companies, especially those of you working in Sanoma Osakeyhtiö and LM Ericsson.

Besides scientific and academic dialogues, I have had many supportive and encouraging discussions with my dear, close friends and relatives that have sustained me, and helped me move forward with my thesis and life. I feel blessed with true friendship and privileged to be able to celebrate this achievement with people like you.

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My dearest sons Riko and Jero have balanced my writing process more than anything else in my life. After coming home to Jero and Riko or picking them up from the school, it never took too long for me to put aside my thesis and problems with the writing process. Despite the fact that there were also moments when I had to stop my smoothly ongoing writing process to rush to my sons, I feel grateful. There are so many things about creativity and innovation, life and people, good and bad in man and most of all in myself I would not have understood or become conscious of without having this family – and I feel grateful just simply because you two belong to my day-to-day life.

Espoo, March 20th, 2002

Minna Forssén

Table of Context

1 Introduction

1.1 Bottom-up ideas as knowledge of personnel

Creativity is the process of idea generation (e.g., West and Farr, 1990). To generate ideas knowledge, discipline and motivation are required in addition to seeing the world from a unique perspective (Weiss, 2001).

Employee knowledge and competences have always been the foundation of any business, and new knowledge always begins with individuals. Andersson (1980) categorized knowledge as declarative and procedural. Declarative knowledge comprises facts we know, and tends to be information that can be verbally communicated. It often takes a form of mental imagery. Procedural knowledge comprises the skills we know how to perform. While the distinction between declarative and procedural knowledge is not absolute, most declarative knowledge can be expressed verbally while much procedural knowledge cannot. An example of procedural knowledge is that riding a bike cannot be described (Andersson 1980).

Explicit knowledge is defined as knowledge which can be transmitted across individuals formally and easily, such as specifications or mathematical expressions and has been the dominant mode of knowledge in the Western philosophical tradition (Nonaka & Takeuchi 1995). Tacit knowledge is personal knowledge embedded in individual experience and is hard to articulate with formal language (Polanyi, 1958; Nonaka & Takeuchi 1995). Internal individual processes like experience, reflection, internalization or individual talents obtain individual tacit knowledge. Their role cannot be managed and taught in the same manner as explicit knowledge (Haldin-Herrgard, 2000).

The new information and communication technology that enables knowledge sharing has created a need and opportunity to divide explicit knowledge into two groups: 1) explicit, easiest to code, and high-structured knowledge, 2) explicit and less-structured knowledge (Maula, 2000; Haldin-Herrgard, 2000). The processes that are based on the less-structured knowledge are especially important for organizations because they help companies to improve their creativity and build their competencies (Maula, 2000). On the other hand, Nonaka and Takeuchi (1995) argue that tacit knowledge is the key to creating innovative products and services and hence competitive advantages. They have suggested that organizations are innovative when individuals share their tacit knowledge and transform it into explicit knowledge. The organization cannot create knowledge on its own without the initiative of individuals and the interaction that takes places within the groups (Nonaka and Takeuchi 1995). Making personal knowledge available to others is the central activity of the knowledge-creating company (Nonaka, 1991; Nonaka and Takeuchi, 1995).

Human beings are creators of knowledge, not only processors of data. Therefore we can draw a distinction between data, information and knowledge (Lillrank, 1998; Davenport and Prusak, 2000) as shown in “the level model” in Figure 1.1. Data is a set of discrete, objective facts about events and it is important to organizations because it is essential raw material for the creation of information. Data becomes information when its creator adds meaning to it. Unlike data, information has relevance and purpose – i.e., that is meaning (Davenport and Prusak, 2000; Nonaka and Takeuchi, 1995). New explicit and tacit knowledge builds on information. Knowledge is seen as dynamic and closer to action than data and information (Davenport Prusak 2000, Nonaka and Takeuchi 1995), and thus knowledge can be used to create more new information and knowledge (Lillrank 1998).

According to Davenport and Prusak (2000) “Knowledge is a fluid mix of a framed experience which values contextual information, and has expert insight that provides a framework for evaluation and incorporating new experiences and information. It originates and is applied in the mind of knower”. Knowledge is typically an immeasurable resource, and is embedded not only in documents or repositories but also in organizational routines, structures, practices, norms and cultures (Walsh and Ungson, 1991; Davenport and Prusak, 2000). Therefore, knowledge does not constitute a homogeneous mass within an organization. Instead, different combinations of knowledge can be found in different organizational units (Augier and Vendelo, 1999).

It can be found that “competence and “knowledge” have very similar kinds of definitions. Sveiby (1997) defines the term “competence” very close to knowledge as defined by Davenport and Prusak (2000). Sveiby (1997) suggests that ones competence include five mutually dependent elements: explicit knowledge through information, skills through practice and training, experience by reflecting on the past, value judgments and social networks.

Ideas can be defined as knowledge, which can be developed and transformed into innovation. An idea is an invention, a sketch or a model for something (Palmberg et al., 1999). The idea adds novelty to the unit of the adaptation of the innovation (West and Altink, 1996). In addition to knowledge, which can be divided into explicit knowledge, tacit knowledge and information, people must have the right motivation and attitude to make knowledge productive (Gurteen, 1998; Weiss, 2001).

Ideas are fundamentally about creative problem solving. Traditionally it has been the specialists working apart from the operational processes who have had the responsibility of creating ideas and innovations. The division of labor, i.e. division of tasks and responsibilities between management and workers (“taylorism”) became the dominant mode in the functional companies in the twentieth century (Bessant and Caffyn, 1997; Huczynski and Buchanan, 2001). But it has limitations. When uncertainty and turbulence increases, technology is threatened and opportunities rapidly change as customer and competitive requirements shift, thus the need for this idea capability increases and traditional hierarchical management approaches cannot fulfill this need. An effective way to increase idea capability is to extend participation in the idea and innovation processes to a much wider group of personnel and to the levels that understand the situations (Leonard-Barton, 1995; Bessant and Caffyn, 1997). A much higher level of participation in innovative problem solving and building participative routines in organizational life are seen to be essential for achieving competitive advantage (Senge, 1990; Nonaka, 1991; Leonard-Barton, 1995). In addition, in the turbulent nature of most organizational environments, the involvement of employees in the innovation process may provide significant aid to the effective management of change, because the more people involved in a change, the more receptive they become to change itself (Kanter, 1983; Bessant and Caffyn, 1997).

However, bottom-up development is a multi-sided concept and should be assessed according to its realization and form, and the results can be different depending on the form of participation (Cotton et al. 1988). The high levels of employee involvement in the innovation process are unfamiliar, untested and risky for many organizations. The most typical problems which militate against a participative bottom-up approach are, foe examples delays in schedule, higher expenses in the planning phase, expectations of short-term returns, beliefs that “ not everyone is creative”, problems in coordination of the process, authority problems, an inappropriate organizational structure to support innovation, and unclear roles (Wilson, 1991; Bessant and Caffyn, 1997).

Innovation requires top management commitment and involvement, because they are the only ones able to resource adequately and pull down barriers between functional departments. In addition, innovation requires a careful balance, dialogue and feedback between top-down strategic drive and the emergence of bottom-up creativity (Smeds, 1996; Boer and During, 2001; Smeds et al., 2002) as well as both centralized and decentralized practices (Suutari, 2001). Nonaka and Takeuchi (1995) emphasize the essential role of middle management in the knowledge creation processes.

Lupton (1991) suggests that detailed knowledge normally resides with those closest to the work, therefore why not use this knowledge to help run the organization thus releasing managers for the vitally important activity of gaining a better understanding of how the enterprise can cope more successfully with the external environment. According to Bessant and Caffyn (1997), studies of high performance organizations, especially those that achieved improvements in productivity through their work forces, place considerable emphasis on involvement on innovation. These cases were characterized by changes in the responsibility for innovation processes. The responsibility was moved away from specialists towards higher levels of participation.

According to Ylöstalo (2001), empowerment of employees in Finnish companies has been increased over the long term. Nearly 60 % of the employees have made one or more suggestions concerning organizational, process or product matters, but the number of bottom-up suggestions has decreased somewhat during the last two years in private companies. However, it is not enough that ideas are collected. Ideas should be utilized and managed from collection to implementation. Bessant and Caffyn (1997) suggest that the effectiveness and capability of incremental innovation can be improved. The development of effective incremental innovation is based on an increased number of behavioral routines, such as structuring idea management and monitoring improvements against goals. Similar arguments have been found in managing innovations in software processes (Paulk et al., 1997). The Capability Maturity Model for software development provides a framework for organizing the small, evolutionary steps that lay a successful foundation for continuous process improvement (Paulk et al., 1997).

There is evidently a need to better manage the bottom-up ideas in addition to top-down strategic drive. According to earlier studies, that bottom-up ideas are not always successfully used and managed. Therefore it is useful to study this phenomenon more and gain more information about how organizations manage the development and implementation of these bottom-up ideas.

1.1.1 Focused summary: the concept of ideas

In this thesis, the ideas, i.e., potential innovations, are seen as the knowledge of personnel emerging from the explicit and tacit knowledge and information people have about their tasks and organizations. The right motivation and attitude is needed as well (Gurteen, 1998). The definition of knowledge is very close to the term “competence” defined by Sveiby (1997). In addition, the focus is on bottom-up ideas because of the requirement for increased idea capability in organizations (Bessant and Caffyn, 1997; Leonard-Barton, 1995; Nonaka, 1991; Senge, 1990). By bottom-up ideas I mean the ideas that emerge from the shop floor, and those of the foremen. (Figure 1.1).

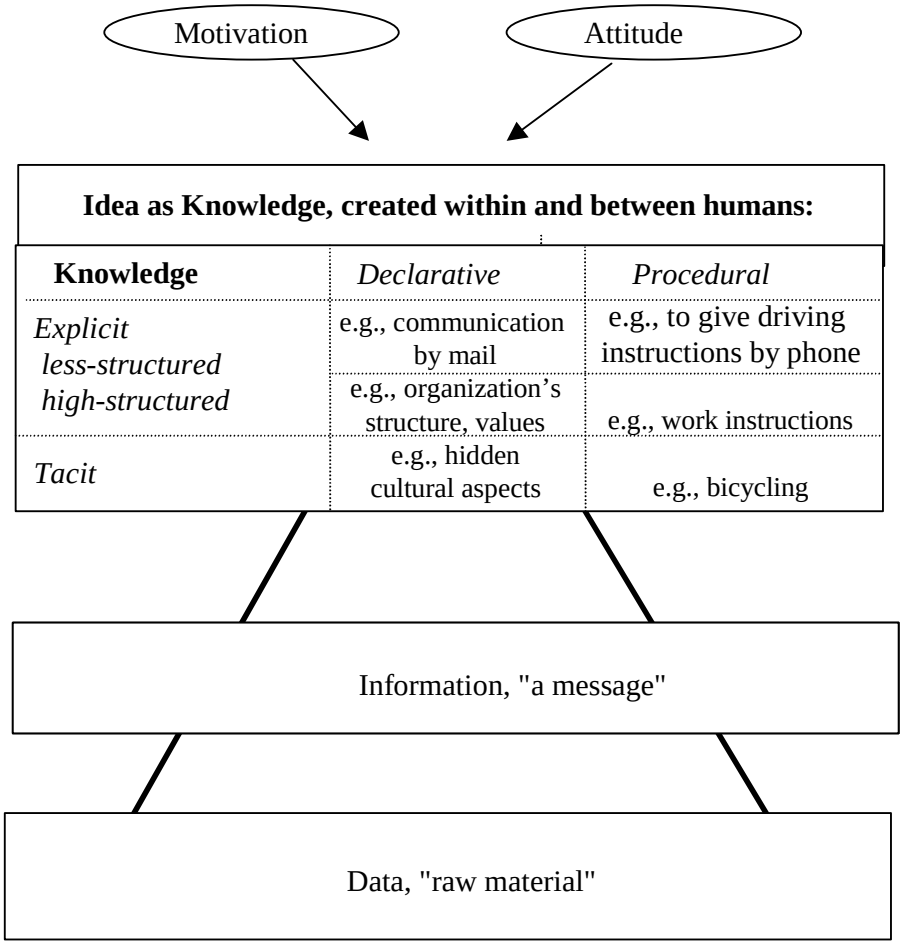

Figure 1.1 The level model of idea as knowledge affected by motivation and attitude (Based on Andersson, 1980; Nonaka and Takeuchi, 1995; Gurteen, 1998; Lillrank, 1998; Davenport and Prusak, 2000)

1.2 Innovations in organizations; types of innovations

Innovation is a rather broad concept that can be defined and understood in many different ways. A differentiation of innovations is important because different types of innovations have different effects and managerial implications for organizations (Palmberg et al., 1999).

Very often the term "innovation" is related with technological novelty and even the words "technology" and "innovation" have been defined as synonyms. In this thesis, an innovation in general is defined more broadly as an idea that has been implemented into a new product or service, process or organizational elements (e.g. communication, reward and authority structure) guiding it to technological, organizational or market change in a value-adding way (Zaltman et al., 1984; Urabe, 1988; Smeds, 1994; Tidd et al., 2001). This definition captures the crucial importance of implementation: new knowledge has to be successfully implemented before it can be called an innovation. Thus, the implementation of ideas for reorganization,

cutting costs, putting in a new reward system, improving communication, or assembling products in teams are also innovations (Kanter, 1983).

Innovations have either an absolute or relative benefit, form a broad perspective, to the individual, the group or organization adopting the innovation (West and Altink, 1996). According to this definition, the ideas that an individual brings to an organization from her/his previous job and implements there can be considered an innovation as well. In addition to using only the sole criterion of economic benefit, the benefit might be personal growth, increased satisfaction, or better interpersonal communication (West and Altink, 1996).

"Creativity" and "innovation" are related and often used as synonyms, but in this thesis these terms are defined differently in terms of the results and processes. Creativity is the process of generating ideas, and innovation is the implementation process of those ideas (e.g. West and Farr, 1990).

According to earlier research, the types of innovations differ from each other in terms of predictors: 1) technological (product and process) and organizational innovations; 2) radical and incremental innovations; and 3) adaptive and reconstructive innovations. Therefore innovation is defined using four dimensions: what is changed; technology or organization?; how is it changed - radically or incrementally?; what is the scope of the innovation?; and what is the result of the innovation – adaptive or constructive?

1.2.1 What is changing?

West and Altink (1996) draw a distinction between technical and administrative innovations. Technical innovations are, for instances the implementation of the idea for a new product, or a service or the introduction of the new elements in the organization's production or service operations. Gattiker (1990) defines a technological innovation as, " a technology-based process, or the product of such a process". Administrative innovations occur in the social system of an organization and include innovations in the organizational structure and in the management of people, for examples a new way to recruit people, or to structure tasks, authority or rewards. According to Damanpour and Evan (1984), administrative innovations have a facilitating effect on technological innovations more readily than the reverse. On the other hand, they found out in their studies that technical innovations are adopted faster than administrative innovations.

Boer and During (2001) grouped innovation into three categories: product, process and organizational innovations. They define FMS-technology as a process innovation and TQM as an organizational innovation. An organizational innovation has typically high complexity because it requires fundamental organizational (e.g. culture) and managerial (e.g. more leadership type of management) changes. Administrative innovation seems to be very close to the definition of the organizational innovation.

According to Tichy and Sandstrom (1974), the most general organizational innovation is to increase worker involvement in decision making about factors affecting their jobs. Other innovations include improvements in the work environment e.g., technological layout, and consultative decision making with employees and management. They found in their studies (Tichy and Sandstrom, 1974), that even though Swedish companies are ahead in the techno-structural innovations, they might be behind in behavioral techniques aiming to improve the organizations' ability to manage change, compared to U.S. companies. With the increased

turbulent and changing conditions in the environment, companies should develop the ability of organizational members to engage in ongoing problem solving and change.

According to Alasoini (1998), there is a complex interaction between process innovations and product innovation. New products need new process technology, and implementing new technology requires new ways of organizing the work and tasks. These process innovations are able to make a product or service in a better way and, therefore, are a powerful source or advance (Tidd et al., 2001). However, comparing product and process innovations, the long-term success of process innovation depends more on a continuing and interactive pattern of change than radical changes (Tidd et al., 2001). Process and product innovations should be seen as representing a continuum rather than a dichotomy, as they are typically interrelated (Palmgren et al., 1999). The synchronous implementation of product and process innovations has positive implications for organizational performance (Damanpour and Gopalakrishnen, 2001). Both types of innovation are considered essential for the description of organizational innovations, and change in organizations (Gattiker, 1990) and a balanced rate of adoption of both administrative and technical innovations is more effective in maintaining and improving organizations' level of performance than either administrative or technical innovations alone (Damanpour and Evian, 1984).

Process and organizational innovations differ from product innovations in terms of the implementation of ideas. Process and organizational innovations have an internal focus, i.e., are most often implemented within the company with the same organizational members who have been involved in creativity processes. Meanwhile product innovations are manufactured into products and launched into external markets by different individuals and departments (Damanpour and Gopalakrishnen, 2001; Tidd et al., 2001).). In addition the adoption of process innovations is more disruptive than product innovations because they involve a larger number of tools, people and a social system.

Technological and product innovations are more "industry-specific", i.e., they are more standardized across the industrial field mean while administrative and process innovations are more "organization-specific" so they are unique to the organizations of implementation (Damanpour and Gopalakrishnen, 2001). Therefore administrative and process innovations cannot be replicated without remarkable modifications to make them suitable and fitting with the implementing organization and its culture, structure and systems, and thus these innovations are less likely to be imitated (Damanpour and Gopalakrishnen, 2001).

Ravichandran (2000) states that the limited research on administrative innovation adoption is a gap in the literature that needs to be bridged. According to him (Ravichandran, 2000) most of the studies have focused on technology innovation adoptions, and limited attention has been paid to the adoption of administrative innovations at least in an information systems context. Hoffman (1999) studied multinational firms and notes that the growth of global markets has renewed interest in using innovation, but much of this has focused on product and process innovations. However, innovative companies do not only focus on product and process innovations but also on managing an enduring environment that enforces a creative climate (Ahmed, 1998). Organizational restructuring requires innovation in organizational structures and management systems (Hoffman, 1999) as well as new technology launches are needed for social processes (Riihonen, 1997). Riihonen (1997), reports about a study on social innovations including over 140 industrial companies in Finland. The study reveals that companies invest mainly in product innovations and technology development, but the holistic picture is missing. Many companies are not even familiar with the concept of social (organizational) innovation and thus the companies do no invest in that. Therefore, with reference to these earlier studies, there exists the need for more study on organizational and process innovations.

Consciously having this holistic approach (product-process-organizational innovations) as an initial frame, this thesis concentrates on both process innovations as well as innovations about administrative, social and organizational elements (e.g. organization structure, management system, reward system, well-being of employees). The latter innovations (administrative, social and organizational) are called simply organizational innovations in this thesis.

1.2.2 Scale of change

The second definition classifies innovations according to the extent of change, in terms of the socio-economic effects of innovations. The basic classification is between incremental and radical innovations (Abernathy and Clark, 1985; Palmberg et al., 1999). Incremental innovations are often a result of "unintended" learning processes through learning by doing and learning by using (Palmgren et al., 1999). The small changes that occur in an organization can pull the organization into a radical new form, and, therefore, even incremental innovations can lead to radical innovations in the long term. This type of change can be called evolutionary change (Smeds, 1994; Smeds, 1997). Although the combined effect of incremental innovations is important in the growth of productivity, no single incremental innovation has overly impressive effects, and thus may be ignored (Palmberg et al., 1999).

Radical innovation can be defined as an irregular event, often as a consequence of focused research and development work, which often includes product, process, and organizational innovation (Palmberg et al., 1999). Thus the changes in a business chain have been discovered to raise new strategies (Mintzberg and Mintzberg, 1988; Eisenhardt, 2000).

Incremental innovations can be seen as an important complement to more radical forms of innovations (Bessant et al., 1994). Hoffman (1999) points out that incremental innovations are far more common in day-to-day working life and therefore management is important. In addition, the incremental approach seems to be more suitable for organizational innovations (e.g. implementing TQM or other concepts), which include learning new practices (Boer and During, 2001).

Referring to these studies mentioned above, the focus of the thesis is on incremental ideas. The study of differences between radical and incremental innovations is excluded from this thesis.

1.2.3 Scope of the innovation

The innovations can be defined based on the scope. The scope means the relative number of organizational members whose behaviors are influenced by innovations (Wilson, 1966). Zaltman et al. (1984) define the extent to which an implemented (adopted) innovation implies changes in the various subsystems of the organization or in the behavior patterns of its members as "solution radicalness". The scope can be large or limited to a small part of an organization. Large-scale changes always involve changes in the subsystems of information, values, incentives, and power (Zaltman et al., 1984). Both large-scale and small-scale ideas are involved (Figure 1.2.).

1.2.4 Degree of novelty; quality of idea

Innovations can be classified in terms of their "radicalness", or novelty (e.g. Harvey and Mills 1970; Zaltman et al., 1984). The more novel the innovation is, the more radical it is. To distinguish this dimension of innovation from the "scale of change", the term "novelty" is used in this thesis instead of radicalness. Novelty can be defined in terms of existing alternatives: the more an innovation differs from the existing alternatives, the higher is its degree of novelty. The degree of novelty classifies innovations into two groups: 1) adaptive, routine solutions that are used to solve past problems, and 2) reconstructive, radical solutions that have not been used before (Harvey and Mills, 1970; Zaltman et al., 1984). Normann (1971) uses somewhat different kind of terms, referring to "variation", equivalent to routine innovations, and "reorientation", equivalent to radical innovations.

The main difference is that adaptive innovations are results of "single-loop" learning (Argysis and Schön, 1996) (second level of learning, Bateson, 1972) where problems are solved within the existing rules. The reconstructive innovations are the results of "double-loop learning (Argysis and Schön, 1996) (third level of learning, Bateson, 1972) where basic norms, rules, and strategies have to be changed to reach a successful solution. According to Zaltman et al., (1984) solutions can contain both adaptive and radical innovations and the degree of novelty has to be determined by using qualitative evaluations.

In this thesis, the degree of novelty of innovations is not studied because the focus is on the process. However it is not unreasonable to expect that some innovations might be "better" than others, and the judgments about the quality and novelty might influence the adoption and implementation behavior. The results of initial studies by Kimberly and Evanisko (1981) show that the distinction between the innovations on the basis of quality is not encouraged in terms of studying the critical successful individual, organizational and environmental factors.

1.2.5 Focused summary: the type of innovation

In this thesis, the type of innovation is classified according to four different dimensions: the focus of the innovation, the degree of novelty, the extent of change, and the scope of innovation.

From the type of innovation point of view, the focus of the thesis is on "bottom-up" technological process and organizational ideas and the incremental innovation processes, whose scope is either small or large (Figure 1.2). The novelty is not studied, thus the novelty of innovation can be either adaptive or reconstructive.

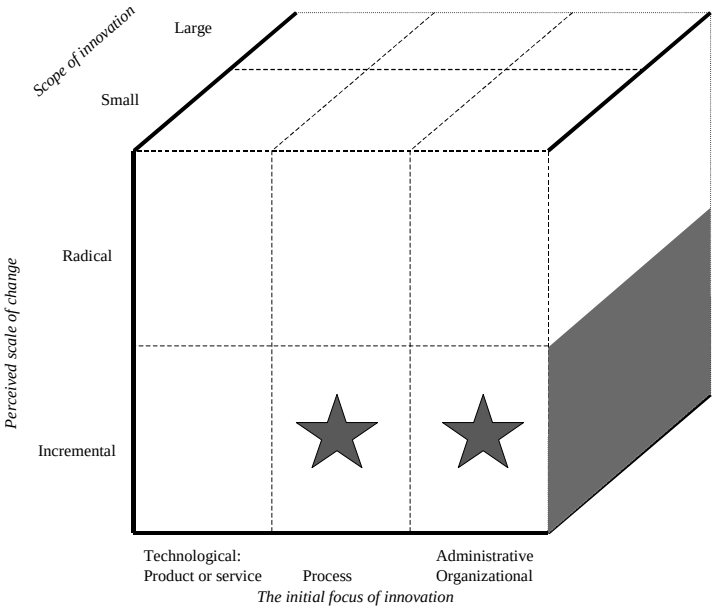

Figure 1.2 The focus of this thesis in terms of the types of innovation.

1.3 The life cycle of ideas – process models

Organizational changes have been conceptualized under different terms and models: organization development and change (Smeds, 1994; Vartiainen, 1994), continuous improvement (Deming, 1994), and innovation processes (Zaltman et al., 1984) as well as learning processes, by a number of authors (e.g. Dewey, 1933; Andersson, 1980; Kolb, 1984; Engeström, 1985; Nonaka, 1994). Learning takes place in all organization change processes. As with other kinds of changes and innovations, incremental innovations need to be managed as a process rather that a single event (Bessant et al. 1994).

1.3.1 Different models

Learning processes, learning models

According to Bateson (1972) learning occurs as a hierarchical process in which there are four levels or logical types of learning. The first level of learning (Learning I) is conditioning. An example of it is the mechanical learning of assembly line tasks. The second level of learning (Learning II) is to learn the context of the first step in trying to find an answer to the question "Why?". The third level of learning (Learning III) includes the challenging of the existing ways of action, e.g., working procedures or management systems. The fourth level would be change in Learning III, which probably does not occur in any adult living organism on earth. The theory of single-loop and double-loop learning by Argyris and Schön (1996) is based on Bateson's (1972) theory. Argyris and Schön (1996) focus on the learning model for managing

attention that may improve the innovation process. Single-loop learning equates with the second level of learning, such as solving problems within given, existing rules. Accordingly, double-loop learning equates with the third level of learning where, for instance, problems and contradictions within tasks and methods leads to a questioning of the rules.

Double-loop learning involves a change in the criteria of evaluation. Past practices are called into question, new assumptions about an organization are raised, and significant changes in strategy are believed to be possible. While double-loop learning can lead to improvements and change, it can also produce low trust, defensive behavior and decreased communication. Therefore, the management of attention must be concerned with not only triggering the action thresholds of organizational participants, but also of managing that action toward constructive ends (Van de Ven, 1986). Here we concentrate on Learning II and III, which are described as follows.

Second level of learning – Single-loop learning

Kolb (1984) emphasizes the essence of feedback, evaluation, and reflection in terms of learning, development, and innovation. Innovation is a change process, which requires learning and learning requires reflection (Kolb, 1984). He sees experience as a source of learning and development. According to his model, the learning process must include all four of the learning stages: concrete experience, reflective observation, abstract conceptualization and active experimentation. Kolb's experiential learning model is criticized because of the grounds for its concepts. According to Miettinen, (1998), Kolb combines different concepts uncritically and thus cannot present any fundamental conception that would connect the phases of his model. Kolb uses the term "experiential" learning emphasizing unique, individual, and direct experience instead of separating primary and secondary experience as Dewey (1993) does. Dewey (1993) distinguishes empirical and experimental learning and defines this reflective thinking and examining process by the following phases. The basis of learning and the initial phase is to settle in an environment, where people adjust themselves unconsciously, without reflection. When problems occur, reflective thinking and examining of the affairs is required. Incertitude leads to the second phase where the problems are identified. The third phase includes analysis and diagnosis and building an alternative solution. Testing the alternative solutions by thinking is the fourth phase. In the last, fifth phase, the solution is tested in practice.

Third level of learning – Double-loop leaning

In the procedure of developmental work research (Engeström, 1985), the point of departure is the work activity as it at presents appears. The second phase is the analysis of the work activity. The following phase of the research is the formation and acquisition of the new instruments needed to realize the zone of proximal development. The next phase of research is the conscious changing of the work activity by practical applications of the instruments acquired. The last phase of the research is the evaluation of the changes.

The learning model of Andersson (1980) hypothesizes that for cognitive skill to develop, declarative knowledge has to be transformed into procedural knowledge. Nonaka (1994) defines knowledge creation to be more interactive and states that knowledge is created through the continuous and dynamic interaction between tacit and explicit knowledge. The four different modes of knowledge conversion are: (1) socialization, when knowledge is transferred from tacit to tacit; (2) externalization or conversion from tacit to explicit; (3) combination, when explicit knowledge is combined with other explicit new knowledge; and (4) internalization when explicit turns to tacit knowledge. Socialization is a process of sharing experiences even without using language and is connected with the theory of group processes and organizational culture. It often starts with building a "field" of interaction – "ba", which

facilitates the sharing of members' experiences. Combination is related to information processing and is a process of systemizing concepts into knowledge systems. It happens when, for example, middle managers break down and operationalize the company's vision or business concepts. Internalization is connected to organizational learning and is closely related to "learning by doing". Externalization is the process of articulating tacit knowledge into explicit. Because the conceptualization of tacit knowledge is often inadequate and insufficient these "gaps" can help to promote "reflection" and interaction between individuals including interaction between tacit and explicit knowledge. Organizational knowledge creation is a spiral process, starting at the individual level and moving across sectional, departmental, divisional and organizational boundaries.

Models of continuous improvement, organizational development and change management

Deming's cycle, or the so-called PDCA-cycle, is an abstraction of continuous improvement (Deming, 1994). In the model, the first step, Plan, includes gathering basic information, analyzing the present state and formation of the to-be model. The second step, Do, involves carrying out the experiment at an appropriate scale. The third step, Check, is studying the results of the experiment. Finally, Act, means taking appropriate action: adopting the change. This means making more experiments at a larger scale, or abandoning the experiment.

The development circle (Vartiainen, 1994) is a generalization of the organizational change models. The development circle proceeds phase by phase and starts at the recognition of the need of change after which the analysis of the present stage is done. After the critical analysis, the following phase is to define the vision and the steps toward implementation. It is often useful to carry out the pilot project to test and evaluate the new ideas before final implementation.

Smeds (1994) presents a generic framework to manage innovative change. Starting with the initial need for change in the business process, its present state is analyzed and modeled. The next phase is to identify problems and opportunities. After modeling and simulation of alternative process solutions, the best solution is selected and change implemented. The last phase is the stabilization of the new mode of operation. The idea of continuous improvement is included in the generic framework, which confirms the knowledge creation and continuous organizational learning.

Innovation process models

The user-based innovation stage models trace the innovation process from the perspective of the user. The stages of the innovation process are: awareness/perception, knowledge, selection, adaptation, implementation, rutinization. (Zaltman et al., 1984; Klein and Sorra; 1996). Several authors have defined the organization-oriented models of the innovation process. Definitions include stages as, 1) idea generation, 2) adoption and 3) implementation (Shepard, 1967); or, 1) inititation and 2) implementation stage (Zaltman et al., 1984); or, 1) evaluation 2) initiation 3) implementation and 4) routinization (Hage and Aiken, 1970).

According to Kanter (1983), Van de Ven (1986), and Urabe (1988) innovation processes consist of both the phase of generation of a new idea and its implementation into a new product, process or service as well as the acceptance of ideas. West and Farr (1990), Gurteen (1998) and Axtell et al., (2000) state that the generation of ideas and implementation of the idea can be seen as two separate sub-processes of the process by which knowledge is developed and transformed into a business value. The result of the creativity process is an idea, and the result of the innovation process is about putting vital ideas into action as a product, service, etc.

Zaltman et al., (1984) define the two stages of innovation process as the initiation and implementation stages. The first initiation stage includes the following sub-stages: knowledge-awareness, and the formation of attitudes toward innovation and decision. The second implementation stage includes initial and continued-sustained implementation. Coming up with the new ideas is the food for innovation. The innovation process is a far tougher proposition than the creativity process (Gurteen, 1998).

Even though product innovations are not the focus of this thesis, some integrating analogies can be found between the innovation process of a new product's development and other innovation processes. A lot of knowledge and experience could be transferred from the management of product development to business process development (Smeds, 2001). The models of new product development processes, such as the "Development Funnel" (Anthony and McKay, 1992; Wheelwright and Clark, 1992; Shepherd and Ahmed, 2000) start from an expansive idea generation, analyzing the best of those ideas to move then to rapid, focused and bounded development projects. The degree of freedom decreases while the process proceeds in this new product development process model. It has also been found that in effective innovative teams, support in the early stages yields a larger degree of freedom and challenge later (West 2001).

1.3.2 Focused summary: Initial framework of the life cycle of ideas in the thesis

All the models above have the joint aim to define the stages of a change phenomenon in terms of development or learning: from initial awareness to implementation through analyzing, planning, testing, and evaluating. The process of generation and implementation of personnel's development ideas, i.e., the life cycle of ideas, can be stage-modeled as well. The stages of the presented models form the basis for the initial framework of the life cycle of ideas of this thesis. This initial framework is further divided into two main processes, creativity and the innovation process (West and Farr; 1990; Gurteen, 1998; Axtell et al., 2000; Zaltman et al., 1984). The initial framework defines stages in which an idea which has emerged from personnel knowledge can proceed before becoming a useful innovation.

Creativity process:

- Analyzing of present stage (Deming, 1994; Engeström, 1985; Smeds, 1994; Vartiainen, 1994)
- Creating new ideas, an expansive idea generation, "to-be"-models (Dewey, 1933; Engeström, 1985; Wheelwright and Clark, 1992; Deming, 1994; Smeds, 1994; Vartiainen, 1994; Shepherd and Ahmed, 2000)
- Analyzing, "filtering" of ideas (Wheelwright and Clark, 1992)

Innovation process:

- Making decisions about the best of ideas (Dewey, 1933; Wheelwright and Clark, 1992; Shepherd and Ahmed, 2000)
- Testing, simulating or carrying out experiments, pilot projects (Dewey, 1933; Deming, 1994; Smeds, 1994; Vartiainen, 1994)
- Evaluating or checking the results (Kolb, 1984; Engeström, 1985; Deming, 1994; Smeds, 1994; Vartiainen, 1994)
- Final Implementation (Dewey, 1933; Deming, 1994; Smeds, 1994; Vartiainen, 1994)

- Spreading the results, stabilization, rutinization (Zaltman et al., 1984; Smeds, 1994; Klein and Sorra, 1996)
- Giving feedback (Kolb, 1984) in terms of learning and continuous development

The first process of the life cycle, the creativity process, includes phases where knowledge is collected and analyzed, and new ideas are developed. The second process of the life cycle, the innovation process, starts by decision making and as new alternatives are tested, evaluated and implemented. Finally, innovations are spread through an organization. (Figure 1.3)

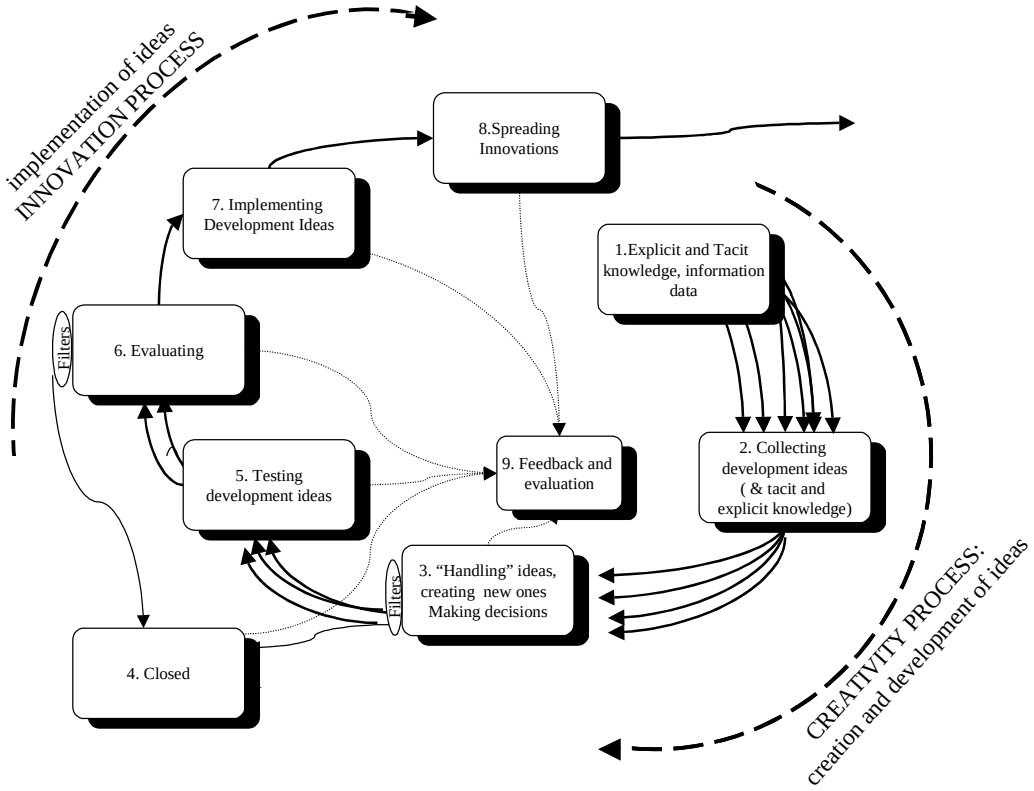

Figure 1.3 The life cycle of ideas in organizations. Based on Dewey, (1933); Kolb, (1984); Zaltman et al., (1984); Engeström, (1985); West and Farr, (1990); Deming, (1994); Nonaka, (1994); Smeds, (1994); and Vartiainen, (1994).

Even decision making is represented as a separate phase; in fact, the generation and implementation of development ideas is a long and cumulative process of a great number of organizational decision-making processes (Urabe, 1988). Each phase includes interaction between employees and thus emphasizes the interaction between tacit and explicit knowledge (Nonaka and Tackeuchi, 1995).

In this initial model, a large number of ideas are first generated then collected, as in NPD-models (Wheelwright and Clark, 1992; Shepherd and Ahmed, 2000). While the process proceeds, the degree of freedom decreases: the prioritization of ideas (filters in Figure 1.3) cuts

down the number of ideas in terms of the strategy, aiming to choose the most viable ones for further examination or implementation (see: Smeds, 1996).

The study of Boer and During (2001) indicates that the first stages of the life cycle are better managed. They found that innovation processes (both technological and organizational) had emphasis on their problem solving, even if they did not take enough time to complete the problem solving cycle. Organizations tended to stop the process upon implementation of the solution. Less or no focus was on organizational adaptation and the spreading of the innovation was neglected.

This thesis focuses on the whole life cycle of ideas, not on the contents of ideas themselves. The life cycle of the idea is defined as an idea generation and development process, i.e., a creativity process that leads to the implementation of an idea, i.e., the innovation process.

1.4 Internal critical factors affecting ideas and innovations

The failures in idea implementation can be caused by failures in the implementation process, or by failures in the idea itself (idea not viable) (Klein and Sorra, 1996; Smeds, 1996). In this thesis, the focus is on the process. The cycle of innovation has become faster, thus the question is how to use the knowledge of personnel. Even if there are studies made on the innovation implementation process (e.g. Klein and Sorra, 1996), earlier research (e.g. Smeds, 1996; Cozijnsen et al., 2000) proposes that factors, which actually facilitate successful innovations and practices for continuously learning organizations, should be further studied. According to Holman et al. (2000) and their study that concerned organizational innovation processes (e.g. TQM, team-based work, learning culture, organizing manufacturing cells) only a small number of companies are managing the innovation process in an effective way. Most often the reason for adopting innovations was reactive, i.e., a reaction to a "significant event". Proactive approaches were less common.

1.4.1 Internal and external critical factors

Organizations function in an environment that is characterized by increased competition, speed of change, fragmentation of the market, and a high level of technological change. These circumstances act as external challenges for innovation. The innovation capability of organizations becomes more vital in terms of the survival in these highly demanding and competitive environments (Smeds, 1994; Wolfe, 1994) and the innovation capability seems to have positive correlations to productivity and profitability (Tidd et al., 2001). Therefore organizational factors for innovation should be taken into account and developed further (Smeds, 1994*).* In addition, opportunities to develop and implement skills in the workplace and to innovate are central to the satisfaction of people at work (Nicholson and West, 1988; Hackman and Oldman, 1980).

Earlier studies show critical factors that seem to either enable or disable creativity and the innovation process. Some studies (e.g., Baldridge and Burnham, 1975; Kimberty and Evanisko, 1981) divide these factors according to whether they are related to external, environmental, internal individual and organization, or group characteristics. Some other studies are focused only on one type of factor and innovation process (e.g. Hage and Aiken, 1970), and the rest have not used the categorization at all.

The organization is not seen as a closed system. It is rather viewed as an open system in continual interaction with its environment. Factors that affect the innovativeness of

organizations appear to be more or less related to one of the internal or external characteristics. Thus the characteristics can be divided into three main categories (see: Baldridge and Burnham, 1975; Kimberly and Evanisko, 1981; Mumford and Gustafson, 1988; Smeds, 1994): 1) external environment, 2) internal individual, and 3) internal organizational/group or situational factors. Having this definition of open systems as an initial frame, we consciously concentrate only on the internal factors excluding external factors in this thesis.

1.4.2 Critical internal enablers and disablers

In the following text the factors are grouped into individual or organizational categories. Individual factors include issues like characteristics of leaders, key persons and organizational members, job related issues as organizational position or role, educational background of leaders, participation, personal attitude or confrontation. Organizational factors include authority structure (centralized – decentralized), organization size, degree of diversity of knowledge, and support from management (Kimberly and Evanisko, 1981; Van de Ven, 1986; Guerteen, 1998; Axtell et al, 2000).

The most conductive internal organizational and individual factors vary between the creativity and implementation phase of the life cycle of ideas (Zaltman et al., 1984; Pierce and Delbecq, 1977; Boer and During, 2001). Axtell et al., (2000) found that the suggestion of ideas (creativity) was more related to personal and job than group and organizational characteristics. According to him, the factors that were most strongly associated with the people making the suggestions (individual characteristics) at the shop floor were that those people: 1) were more confident across a wide range of work areas; 2) had more autonomy; and 3) expressed greater concern for work issues. The implementation of the ideas, i.e., the application of those new ideas in practice, tends to be predicted more by group, organizational, and societal characteristics (Axtell et al., 2000; West and Farr, 1990; West and Altink, 1996). The shop floor employees in particular may be more reliant on the group or organizational context in order to get their ideas implemented than professional employees. The support from management is a prime area in the organizational context to consider when trying to increase the implementation of employees' ideas (Axtell et al. 2000). The innovation process, i.e., the implementation of shop floor ideas, seemed to succeed according to Axtell et al. (2000) when 1) the team environment, team leader as well as management is supportive of the innovation; 2) employees participate in decision making; and 3) teams have a broad range of responsibilities.

Individual characteristics and factors

According to Ekvall's (1996) quantitative research, the *change-oriented leadership style* correlates strongly to the creative climate. Accordingly a task- and structure-oriented leadership style shows weak or zero correlations including creativity-inhibiting and promoting elements. He concludes that the climate and organizational conditions are to a large extent in the hands of the manager.

According to Boer and During (2001) innovation *requires top management commitment and involvement.* Top management must realize that knowledge needs to be nurtured, supported, enhanced and cared for. Kanter (1983) reports that in low-innovative companies people felt that "knowing everything" depicted the *attitudes* of the top managers and left no room for new ideas. For a successful innovation and development process, managers need *a long-term view instead of the desire for quick fixes* (Lanning, 1996; Bessant and Francis, 1999; Holman et al., 2000; Boer and During, 2001). It is essential for managers to understand change as a messy,

iterative, political and emotional process instead of a linear and mechanistic one (Holman et al., 2000).

Active, authorized people, change champions in different hierarchical levels and informal horizontal and vertical networks in organizations should be utilized to spread and implement innovations (Van de Ven, 1986; Smeds, 1996; Hoffman, 1999; Zemke, 1999). Champions are active individuals who promote or influence the adoption of innovation within their organizations (Hoffman, 1999). Kanter (1983) talks about the entrepreneurial spirit, which enforces innovation processes in organizations, and that spirit should be found on all organizational levels. A favorable attitude, or a champion, and some formal or informal power, such as a coach, are required for the innovation process (Boer and During, 2001).

Pierce and Delbecq (1977) state that age has a negative correlation to innovation. On the contrary, Baldridge and Burnham, (1975) states that individual characteristics like *age*, sex or personal attitude do not affect innovation as much as position or organizational factors, for example. The latter is supported by the research results suggesting that somewhat different optimal environments and climates may be required for maximizing the creative achievement of younger and older adults (Mumford and Gustafson, 1988). Axtell et al., (2000) studied shop floor innovations and concluded that successful implementation of new ideas requires both an appropriate supportive environment and *ideas formulation in the first place*. Van de Ven (1986) stresses developing ideas into good currency as one critical issue in managing innovation.

Organizational characteristics and factors

To be able to present one's own ideas requires a confident, encouraging, and non-accusatory work community, thus *climate* seems to be one critical factor (McAdam and McCreede, 1999; Mayo, 1998; Kokko, 1998; Kanter, 1983; West, 2001; Ekvall, 1996). Freedom from threat and pressure, emphasis on quality as well as supportive environments enable and stimulate creativity (West, 2001; Ahmed, 1998). Ekvall (1996) listed organizational *climate* dimensions that affect and correlate, either stimulating or hampering the creativity and innovation capability of the organization based on his longitudinal studies. These conditions that create organizational climate according to Ekvall (1996) are: challenge, freedom, idea support, trust/openness, dynamics, playfulness, debates, conflict, and risk taking. Learning and innovation can take place only if members of the organization trust others members´ intentions; errors can be discussed; people feel a win-win *communication*; and well-intended actions do not lead to punishment or judgment and rejection by others (Gurteen, 1998). According to Nonaka and Konno (1998) companies should have a "Ba" (equivalent to "place" in English), a shared space for emerging relationships and for advancing individual and/or organizational knowledge by human interaction.

In addition to the level of *communication*, the *organization structure* affects the innovation (West and Altink, 1996). Flat organizations and a high level of communication between departments and functions are more likely innovative than traditional hierarchical organizations with vertical communication. Kanter (1983) sees an integrative organization as an enabler of an innovation process. The integrative organization can be defined as team-oriented and communicative, where problems are solved as a whole. In contrast the segmental can be defined as an organization where pieces are isolated from each other and little communication take places. The prevailing approach for handling organizational complexity is to divide the labor among the specialists who are best qualified to perform unique tasks and then to integrate the specialized parts to create the whole. The objective is to develop an organizational design where the whole is greater than the sum of its parts. Still, the whole turns out to be less in segmentalism because parts do not add up to, but subtract from one other (Van de Ven, 1986).

In addition, problems occur in organizations where authorities and power are divided functionally by units and this feeds the organization members' functional thinking (Kanter, 1983; Hammer and Stanton, 1999; McAdam and McCreede, 1999). Enabling bureaucratic environments have rules that help to guide activities, clarify roles, and facilitate participation in decision making and in communication (Adler and Borys, 1996; Shadur et al., 1999).

Thus part-whole relationships have to be managed in terms of successful innovation. The *authorization, responsibilities, and roles of managers and key persons* in organizations should be well defined (Lanning, 1996) and, especially in a process organization, the roles of process owners, to order to succeed (Hammer and Stanton, 1999). A process supervisor must have real authority over the design of the process, measuring its performance and training frontline workers (Hammer and Stanton, 1999).

An organization needs sufficient *financial slack and time lag* into a process in terms of the successful innovation process (Lanning, 1996; Bessant and Francis, 1999; Holman et al., 2000; Boer and During, 2001). The quick fixes easily lead managers to failure in not realizing that symbolic and material resources would be required beyond the initial adoption implementation phase. The *resources* and *structural schemes* to support innovations enable the creativity process and implementation of ideas. Lack of time and discipline, high demands of work (e.g. work overload), and resource scarcity can also mean that employee emotional resources are drained and they fail to input data that they are happy, in principle, to share (Cordes and Dougherty, 1993; Mayo, 1998).

If an organization has a *reward* system, it should use this system to manage innovations to enforce and harness the creativity and innovativeness of the employees (West, 2001). An inadequate reward system prevents the success of development projects as well (Lanning, 1996).

The *participation approach* to decision making is facilitated in creativity and innovation processes and has positive effects on innovation success (Axtell et al, 2000; Cozijnsen et al., 2000). It is essential to increase the participation of the shop-floor workers rather than just utilizing consultation (Lanning, 1996; Holman et al., 2000).

The ability to treat failures as a learning event and learn *from mistakes*, and trial and error learning, is seen as an enabler (Bessant et al., 1994; Holman et al., 2000; Boer and During, 2001). Companies are particularly poor at learning from their experience in managing change. New practices were not evaluated against initial objectives, and this inhibits the further development of change and innovation capabilities. In addition, an organization should invest more in internal diffusion and spreading successful innovations within a company (Boer and During, 2001).

Holman et al., (2000) suggest that it is essential in terms of successful implementation not only to focus on technology, but to consider implementation in *a more systematic way* including other aspects of organization, such as job and work design or the accounting system. Ignoring these can easily lead to an implementation with too little consultation and participation.

Diversity of knowledge, different experience and backgrounds, integrated working, highly motivated people, emphasis on quality and external challenge are critical for innovation, especially in creativity (Zaltman et al., 1984; Pierce and Delbecq, 1977; West, 2001). The *management of learning*, that is, training, periods of review or reflection, should be improved. Boer and During (2001) conclude that innovation requires more attention be paid to the skills required to be able successfully to contribute to innovative activities: in addition to technical skills, considerable social and managerial skills are also required (e.g., the project leader). Holman et al., (2000) emphasized the importance of the *techniques and methods that develop learning and experience* and facilitate creativity as well innovation. These techniques are, for

example, end-user participation, cross-functional teams, periods of review and reflection, action learning, and evaluation of the practice. The benefits of using these are, firstly, that they aid the creation and dissemination of knowledge (Nonaka, 1995). Secondly, they can facilitate seeing the holistic view of the social, political and technological practicalities of change and managing the system. Finally, evaluating, reviewing and reflecting rarely happen in any systematic manner. These techniques, e.g., weekly problem solving and a solving review, which also gives the needed "buffer", can facilitate evaluation and help organizational members improve innovation capabilities as well as learn from their experience, at which companies are poor (Bessant and Francis, 1999). Again, *teamwork* can improve organizational learning and innovation (Alasoini, 1998).

Boer and During (2001) found that *a careful balance between top-down strategic drive and bottom-up emergent creativity* help companies to prevent or reduce innovation bottlenecks. The strategic view is regarded as important in the innovation adoption phase; even practices were often adopted with relatively little strategic thought according to the study of Holman et al. (2000). To develop an organizations' incremental innovation capabilities, strategic goals should be better communicated and deployed as well, and improvement activities should be guided by a process of monitoring and measurement against these strategic objectives (Bessant and Francis, 1999).

Factors affecting product, process, and organizational innovations

Management scholars (Kimberly and Evanisko, 1981) have pointed out that the drivers and the underlying processes of administrative innovations could be quite different from those of technological innovations, and that findings about technology adoption cannot be easily generalized to administrative innovations. Organizational and process innovations seem to require much more initial diffusion than product innovation (Boer and During, 2001; Damanpour and Gopalakrishnen, 2001) since process and organization innovations have an internal focus. Process and organization innovations having an internal focus, i.e., "the market" within, will be implemented as an internal one, involving most often the same people as in the creativity and development phase departing from project innovations that have a market focus (Damanpour and Gopalakrishnen, 2001; Tidd et al., 2001). Implementation of organizational changes is not easy because conflicts of interest as well as people easily resist or at least are cautious about change. There are formal practices to deal with resistance (e.g., training) but emotional responses (e.g., fear of loosing power, status) are more difficult to deal with and need a supportive and reassuring climate (Tidd et al., 2001), thus, the role of implementation and its management is significant for process and organizational innovations. According to Tidd et al., (2001) the effective practices of managing implementation of process and organizational innovations are; (1) establishing a clear change management strategy at the top level; (2) communication; (3) early involvement; (4) creation of an open climate; (5) setting of clear targets and giving feedback; and, (6) investment in training. The closure of the life cycle is essential to reinforcement of the innovation process, motivation and further suggestions. Failures to manage implementation or idea-rejection will easily lead decreased motivation and shrinkage of the continuous innovation process (Bessant et al., 1994).

Ravichandran (2000) studied administrative innovation, Total Quality Management (TQM), in systems development and concluded that the organizational forces that underlie administrative innovations are complex and varied. Therefore, current understanding of these critical factors remains at a general level and is under examined at least within the information system context (Ravichandran, 2000) as well as the understanding of the organization innovations as a whole, as mentioned earlier.

On the other hand, Boer and During (2001) noticed that there were similar disablers between product, process and organizational innovations, for examples companies do not take sufficient time to complete the implementation of the innovation; the range of functions in the innovation process was too limited; and, internal diffusion was usually neglected while the emphasis was on problem-solving (i.e., beginning of the life cycle).

Based on these earlier studies, the understanding of the critical factors needs to be increased. The factors affecting organization innovation in particular seem to be complex and under examined.

1.4.3 Focused summary: the internal critical factors

This thesis focuses on the organization's internal factors, which are related to individual or organizational characteristics and that affect the creativity and implementation processes of organizational and process "bottom-up" ideas and innovations (Figure 1.4). Process and organizational innovations seem to need more support from management and a supportive climate to be successfully implemented than do product innovations. The external environmental factors are excluded from the focus of this study.

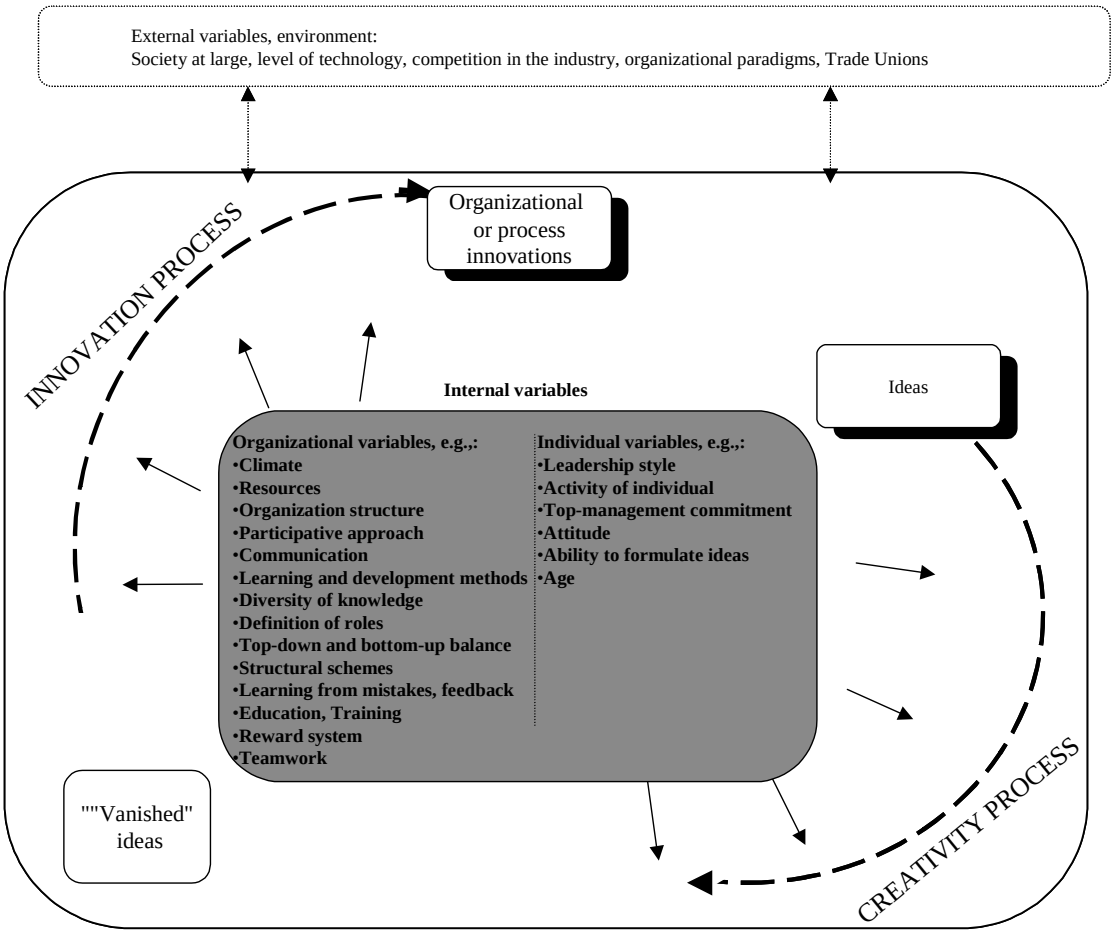

Figure 1.4 Internal factors that enable or disable the life cycle of ideas.

The earlier studies show several individual and organizational factors that enable or disable the innovativeness of an organization. According to the number of references, it seems that the most critical individual factors are *leadership skills* and the *activity of organizational members (e.g. champions)*. The most critical organizational factors were *organizational climate*, *organization structure*, *recourses* (especially time), *communication*, and *participation approach* in organization development. The internal factors are shown in the indicative order of importance based on the earlier studies in Figure 1.4.

2 Research aim and questions

The main aim of this thesis is to study the creation and development of incremental "bottom-up" ideas, and their implementation processes into innovations in organizations. The thesis is focusing especially on organizational and process ideas excluding product development ideas.

The focus from this perspective is to understand the internal organizational factors that affect the generation and implementation of the "bottom-up" ideas, i.e., the organizational creativity and innovation processes. In addition, the study is focused on organizations where the participative organization development method called simulation game has been used. The three main research questions are:

(1) How is the life cycle of bottom-up ideas managed in organizations? (Study IV, I, II and III);

(2) What factors enable or disable the life cycle and the implementation of bottom-up ideas? (Studies IV, II and III)

(3) How is the participative simulation game method used in the life cycle of "bottom-up" ideas and innovations, and what is achieved? (Studies I-IV)

3 Data and research methods

This study is based on data reported in more detail in four studies that are related to each other (Figure 3.1). This thesis follows the theory-building approach (Eisenhardt, 1989), instead of the "mainstream" theory-testing approach. The study starts from an initial framework and after empirical data are collected, new insight emerges. The dialogue between empirical data and earlier literature/studies pushes the research process along. Therefore, the process is iterative and communicative, which is essential to the theory-building approach.

The data includes 33 cases, in other words 33 separate training and organization development projects performed in 17 companies. In all 33 of the projects (cases studies), the simulation game method was used as a training and development tool in total 90 times. In addition, data was collected through broad interviews in two case study companies.

In the first three, Studies I-III, the focus was on the simulation game method, its use in bottom-up development and the results achieved. The aim of Study IV was to study not only the life cycle of ideas that came up in the simulation games but also other bottom-up ideas in the case companies.

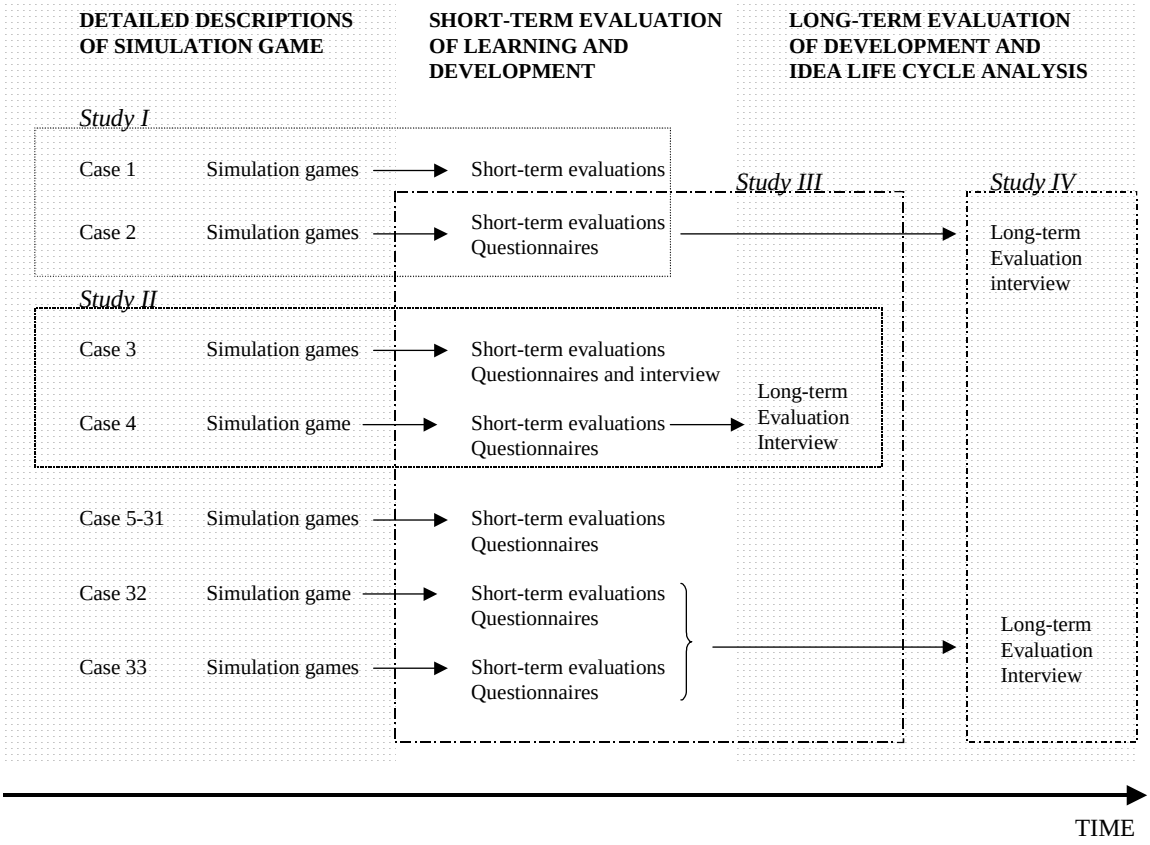

Figure 3.1. Progress of the research and the data collected in Studies I-IV.

The individual studies can be described in more detail as follows. Studies I and II describe in detail, how the simulation game, the participative organization development and training method was used in different organizations. Studies include a short-term evaluation of the effects on learning and organization development in the four organizations. The short-term

evaluations of learning and organization development in the case studies (Studies I-III) mean results achieved less than six months after the simulation game sessions. In addition, Study II explores the long-term outcomes of the implementation of the development ideas and the essential factors for successful implementation. Study III reviews the results of 88 simulation game sessions held in 32 different organizational development and training projects including three cases described in detail in Studies I and III [1]. The evaluation of the results focuses on the effects of learning and organization development.

Study IV focuses on the life cycle of bottom-up ideas in general. It studies the life cycle and implementation of bottom-up development ideas that come up in different situations and day-to-day life in organizations and the enablers and disablers in the life cycle of those ideas. Study IV was based on the interviews made in two case companies, which were also included in Study III.

In the first three studies (I-III) the questionnaire, and interviews as well as note making were used as the main data collection methods. In Study IV, the main data collection method was interviews. The questionnaire (Appendix 1) included both multiple-choice and open questions. Note making (the research diary) included a description of the development process, participants, and numbers of ideas collected in the simulation game sessions etc. Interviews were used for two different purposes. Interviews to study problems in the business process were made in the initial phase of each case project. These interviews were not used as data in this thesis.

Evaluation and study on effects and the results of the simulation game as well as the study on idea and innovation life cycles were done by both short-term and long-term evaluation interviews (Appendix 2). Short-term evaluation interviews were done just after some of the game sessions in six cases (Studies I-III), and some were taped for analysis. Long-term evaluation interviews (Appendices 2 and 3) were made only in three cases including 63 interviewees, 17 in Study II and 46 in Study IV (Table 3.1). Long-term interviews were made from one to four years after simulation game projects. Long-term interviews were taped and typed before analysis. In addition, data from Study IV was analyzed using the software tool "Atlas. I".

The field notes were converted into write-ups, so that it could be further read, coded and analyzed. The summarizing and packing of typed interviews and write-ups were based on the themes (codes) of the semi-structured interviews (i.e. a start list of codes). However, because some codes changed and additional codes developed (e.g. different enabling and disabling factors), the data was repacked according to these new groups. In addition, some codes did not work (e.g. testing ideas). Together the repacked data created a new framework including the definition of the life cycle of ideas and its phases as well as disabling and enabling critical factors. After reading, coding and analyzing the data, the results were sent to the interviewees for feedback and comments.

Table 3.1. shows how Studies I-IV and the research questions are related. The first research question of this thesis is answered by the data mainly from Study IV, and partly also from Studies I-III. The data for the second question comes from Studies II-IV. The third research question is answered based on Studies I-III and partly on Study IV.

Studies I-III were done following the participatory action research approach (Argyris et al, 1985; Whyte et al., 1991). The fourth study was done as a qualitative comparative case study in two industrial companies.

[1] To avoid misinterpretation, it has to be mentioned that the numbering of the cases in Figure 3.1. is not the same as in Study III.

Table 3.1. Research design; the relationship of research questions to studies as well as data and research methods per study (secondary use of data denoted with ✧).

Research Questions and Data	**Question 1.** **Question 2.** **Question 3.**			
Study	**I**	**II**	**III**	**IV**
Research aims	The use of the simulation game method for production development	The use and role of the simulation game method for organization development, its role in the idea life cycle.	The results of using simulation game method as a tool in different business processes and purposes	The life cycle of bottom-up development ideas in organizations.
Research Approach				
Case study	✧	✧	✧	✧
Action research	✧	✧	✧	-
Mode of Explanation	Descriptive	Descriptive	Descriptive and Explanatory	Explanatory and Theory building
Research methods				
Questionnaire	✧	✧	✧	-
Interview	✧	✧	✧	✧
Note Making	✧	✧	✧	-
Project Documentation	(✧)	(✧)	-	-
Videotaping	-	-	(✧)	-
Research data				
# of cases	2 projects, incl. 9 games	2 projects incl. 3 games	32 projects incl. 88 games	2 companies
# of respondents in questionnaires	137	66	1497	-
# of respondents in interviews	20	27	32	46

4 Life cycle of bottom-up development ideas

4.1 Management of the life cycle of ideas

The initial life cycle of ideas represented in Chapter 1.3 (Figure 1.3) is used as an initial framework to analyze research data. Each phase of the initial framework seems to have somewhat different phase-specific disablers. For the purposes of comparison, the life cycle is now divided into three processes. Firstly, the creativity process includes collecting and handling ideas. Secondly, the innovation process includes making decisions, testing ideas, implementing ideas, and spreading innovations. In addition to creativity and innovation processes, the evaluation process of the life cycle was divided as an individual process including feedback and follow-up procedures.

4.1.1 Creativity process

Case organizations in Study IV had more procedures, “tools” and methods (e.g., an idea box, development teams, suggestion competitions, simulation games) for the creativity process i.e., for idea development and collecting, than for the innovation process, i.e., for handling and decision making, idea testing, implementation, spreading ideas or giving feedback. Parallel results were found in Studies II-III.

Still some problems were found in the creativity process in Study IV: one problem in idea collecting was that ideas were not written down even though they were discussed. Systematic collecting was missing and thus, ideas were forgotten. The importance of documenting ideas was found in Studies I-III as well. Some employees felt they could not sell their ideas, especially when ideas are not collected actively (Table 4.1)

4.1.2 Innovation process

One of the biggest problems in decision making was that the handling and decision-making procedure was unclear and slow (Study IV). Another problem was how to prioritize the huge number of collected ideas. In addition, there were not always the right people involved in the teams that made the decisions. Results from Study IV indicate that many members of the organization did not have a clear picture of the procedures after decision making, after which, implementation activities just ”vanished”.

Even if the autonomy of individuals, teams and departments and reduction in the degree of centralized control facilitates innovation, centralized control may be required in some phases of the innovation process to ensure an effective implementation (Zaltman et al., 1984). Kanter (1983), Van de Ven (1986) and West (2001) record similar kinds of critical factors.

People did not know what happened to the ideas, which went to other departments in particular. Problems in the implementation phase occurred when responsibilities were not clearly defined, informed to others nor named at all. “Barriers” between departments as well as the lack of training and tutoring in the implementation phase caused implementation problems (Studies III-IV).

Changing the mode of action, i.e., implementing organizational innovations, was more difficult than for examples, concrete technical changes and innovations (Study IV). According to Boer and During (2001) organizational innovations require more internal diffusion than technical innovations. The implementation of organizational innovations, such as TQM, requires cultural

change, which is not easy to achieve. It needs deep-rooted acceptance, and much communication between different functions.

Table 4.1 The most frequently mentioned disablers of the creativity, innovation, and evaluation processes of the life cycle (mainly from Study IV, but also from Studies I-III).

PROCESSES OF THE LIFE CYCLE	**Phase of the creativity, innovation, and evaluation processes**	**The most frequent mentioned phase-specific disablers**
CREATIVITY PROCESS	COLLECTING IDEAS	• Ideas are not written down • Difficulties in "selling" ideas, timidity • Ideas not actively collected • Difficult to express development ideas to the other departments (“inter-unit” ideas) • Bottom-up ideas die
INNOVATION PROCESS	“HANDLING” IDEAS, DECISION MAKING	• Prioritizing, a huge amount of data • Not enough knowledge in decision- making process, right people not involved • Handling and decision-making process unclear and too slow
	IMPLEMENTATION	• People not active enough (if somebody has a proposal, he does it all by him/herself) • Implementation of top-down ideas not easy • Changing a mode of action more difficult (organizational innovations) than concrete technological changes • "Realizer" not competent • Person responsible for implementation process not clearly defined or missing • “Barriers” between departments • Lack of training and tutoring
	SPREADING	• No systematic information system • No information from one department to another • Unclear where to find information about ongoing improvement projects • No information from employees to others
EVALUATION PROCESS	GIVING FEEDBACK	• No systematic feedback • No feedback from skipped ideas
	FOLLOW-UP	• Follow-up missing or not systematic • Not learning from mistakes

The most successful official channels to spread innovations seemed to be informal discussions, forums or teams at the division level, or a job rotation program (Study IV). Direct contacts between people appeared to be an essential factor to improve implementation and spread innovation. Senge (in Zemke, 1999) recommends people find real colleagues, a natural network of like-minded individuals to create and present new ideas instead of doing it alone. Study IV revealed that the biggest problem was a lack of information about new innovations and the knowledge where that information was stored in organizations. Thus it was difficult to spread innovations throughout organizations. This was partly true because there was no systematic collection of information or, existing official channels like final reports of projects were not used efficiently enough. One manager pointed out that ideas need to prove their efficiency if you want to spread them to other units. In addition, it was true that that some ideas cannot be implemented in exactly the same way in different departments because of differences in department cultures.

Holman et al., (2000) found out that it is essential to understand the implementation in a holistic way and to understand its impact on middle management. This might become a significant barrier because innovations call for new forms of management control. In Study IV some managers articulated if there is no "agreed and official structure" to handle ideas one authorized person or manager can easily stamp out employee ideas.

4.1.3 Evaluation process

Study IV showed that many ideas did not necessarily proceed as initially planned at the first stage, but found other ways to advance. Still the absence of systematic follow-up and feedback led to the impression that the ideas were not implemented. People also mentioned that new information technology provides better opportunities now for follow-up and feedback, but is not yet efficiently used.

According to Study II and IV, the follow-up of the progression of the ideas was very important for the success of organization development. The study showed good examples of defined and official procedures for the handling of findings, including a feedback procedure in addition to the intranet idea-box, where one could follow the status of ideas. Follow-up was formally named someone's responsibility, or maintaining "action-point" lists in meetings followed implementation. Despite these official structures, it was found that follow-up and getting feedback was still too dependent on one's own activity. Decisions were made easily at simulation games or meetings, but too often their implementation failed. A systematic follow-up was a driving force of implementation. According to Tidd et al. (2001) and Holman et al. (2000) an integrative approach to the management of innovation is required, i.e., feedback, structures, and processes which support innovation.

4.1.4 Differences between creativity, innovation and evaluation processes

The ideal situation would be that the degree of freedom is large in the initial phases, i.e., in the creativity process, and the degree would be narrowed down in implementation (Zaltman et al., 1984) as in the R&D funnel models show (e.g., Anthony and McKay, 1992; Wheelwright and Clark, 1992). This was especially true in developing established product groups. In progressing towards implementation, the number of ideas decreases and working should become more controlled (Wheelwright and Clark, 1992).

Studies II and IV, however, indicate that the practice in organizational and process innovation is nearly the reverse (Figure 4.1). Even though the research in innovation processes suggests well-established principles of change that enable successful idea generation and innovation (Pierce and Delbecq, 1977; West and Farr, 1990; Axtell et al., 2000), empirical findings of this study on creativity, innovation, and evaluation processes demonstrate that these principles were not necessarily practiced. Emphasis was on the creativity process, i.e., idea collection and decision making, where the procedures, tools and methods were better structured and managed, whereas the innovation and evaluation processes were less formalized and followed. It seems that in the case companies the degree of freedom of structures and procedures increased phase by phase while the idea life cycle proceeds. Hence better management of implementation and follow-up was certainly required.

While the creativity process should have a more flexible system, the higher degree of organizational complexity (the number of occupational specialists and their professionalism with a very differentiated structure), lower formalization (specific rules and procedures), and not centralized decision making (the locus of authority and decision making), the implementation process should be more structured, and facilitators are opposite: lower complexity as well as higher formalization and centralization (Hage and Aiken, 1970; Pierce and Delbecq, 1977; Zaltman et al., 1984). According to Studies III-IV, increased structure in the implementation phase can take the form of a project, while the management of implementation as a project was seen as an enabler for the innovation process

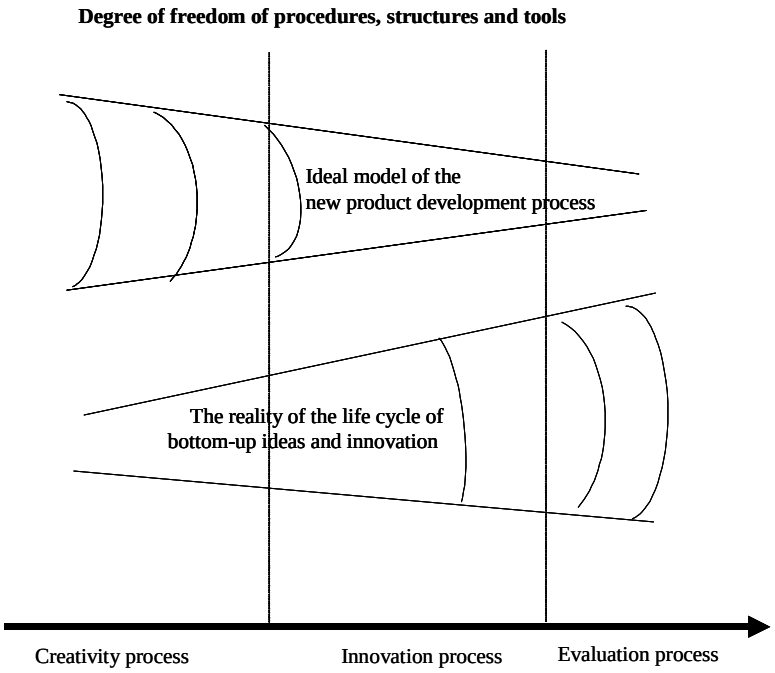

Figure 4.1 The ideal innovation model (based on the ideal NPD-funnel model and the theory of innovation processes) compared to the reality found in Studies IV and II.

4.2 Enabling or disabling factors in the life cycle of ideas

Studies I-IV showed certain enablers and disablers that seemed to affect the progress of "bottom-up" development ideas, i.e., the whole life cycle of ideas. There were, for example, enablers like structured life cycle, good communication, understanding of the terms and concepts, matrix and process organization structures, managers with good leadership skills and a very active person as well as disablers like a non-structured idea life cycle, a lack of knowledge about processes, and problems in leadership. Most of the enablers and disablers seemed to be opposite sides of some particular organizational and individual factors: the structure of the idea life cycle, communication, knowledge, participation, climate, development resources, organization structure, training activities and definition of the roles of organizational members as well as the activity of individuals, and leadership skills. They seemed to have a crucial enabling or disabling effect on the life cycle of ideas, depending on the level of these factors (Table 4.2). In addition, mainly Study IV but also Studies II-III show that there are more critical organizational factors than individual ones that affect the life cycle of ideas.

The critical factors that emerged from these studies can be compared with the critical factors found in the earlier studies. The following studies (Axtell et al., 2000; Hokkanen, 2001; West, 2001) were chosen for the comparison. The first criterion for the choices was to select studies focusing on critical factors in different kinds of organizations and fields. The second criterion for selecting the three studies was that they had used surveys for data collecting. The third criterion was to choose recent studies.

Axtell et al. (2000) studied shop floor innovation and the impact of individual perception of individual, group and organizational factors. In this quantitative study, participants were 148 machine operators from a beverages manufacturer. Hokkanen (2001) examined profiles of innovative learning communities and the factors leading to success from the perspective of innovativeness in the educational field of technology and transport. He interviewed employees from 12 polytechnics and analyzed 67 questionnaires. In addition, Hokkanen (2001) used organizations' documents to collect data. West (2001) has studied different teams in the health care and broadcasting fields. The data includes 400 health care teams and 27 top management teams in hospitals (West and Andersson, 1996), and 18 BBC television education programme production teams. All the critical factors discovered in these studies are compared in Table 4.2.

The most critical organizational and team factors according to Table 4.2 (i.e., found in three or four studies) were: participation, organizational climate, communication, development resources, diversity of knowledge, and clear, shared targets. Participation, organizational climate, communication, and development resources were also found in earlier studies (in Chapter 1.4), in addition to organization structure. The factors that facilitate an organization's ability to differentiate the degree of organizational complexity, formalization, and centralization in creativity and innovation processes are the capability for effective interpersonal relations and dealing with conflict (Zaltman et al., 1984), which is a parallel result with this study, i.e., leadership skills and communication were essential enablers during the whole life cycle of ideas.

According to Table 4.2 as well as earlier studies (in Chapter 1.4), the most critical individual factors were active individuals and leadership skills. According to Ekvall, (1996) and Cozijnsen et al. (2000) leadership skills and style seem to be the most important internal critical factors in terms of creativity and innovation. According to Salminen (2000) active local leadership, a high degree of participation with real decision-making power, and a systematic motivation-based project control are the key success factors of change management.

Table 4.2 The critical factors of the life cycle based on Studies II-IV (this study) and earlier studies.

CRITICAL FACTORS	This Study	Axtell et al. (2000)	Hokkanen (2001)	West (2001)
ORGANIZATIONAL/TEAM FACTORS				
Holistic, structured life cycle of ideas	✧			✧
Communication between people, departments, different parties	✧		✧	✧
Participation in development and decision making	✧	✧	✧	✧
Customer participation	✧		✧	
Supportive organizational climate	✧	✧	✧	✧
Mutually understood terms	✧			
Holistic understanding of the business process	✧	✧		
Clear and shared targets	✧		✧	✧
Diversity of knowledge in teams	✧	✧		✧
Development resources; time, pace	✧		✧	✧
Money, employees	✧		✧	✧
Organization structure: functional or process/matrix	✧			
Definition of roles, authorities, responsibilities	✧			
Training activities	✧		✧	
Innovative methods, tools for learning, learning from mistakes	✧		✧	
Rewarding				✧
External demand				✧
INDIVIDUAL FACTORS				
Competent persons	✧		✧	
Active individuals, champions	✧	✧	✧	✧
Leadership skills of managers	✧	✧	✧	✧
Top manager support	✧		✧	
Age	✧			
Ability to “sell” and formulate ideas	✧	✧		
Administrative role and position		✧		
Variety of work, autonomy, and opportunities at work		✧		✧

Mutually understood terms, a process/matrix organization structure, and definition of roles were the critical enabling factors that emerged from this study (Studies III-IV). The factors

were not found in the compared studies (West and Andersson, 1996; Axtell et al., 2000; Hokkanen, 2001; West, 2001). However, supportive findings can be found from other earlier literature (in Chapter 1.4, e.g., Kanter, 1983; Hammer and Stanton, 1999).

It was found only in this study (in one case company in Study IV) that younger employees were more innovative than older ones. Findings from earlier studies vary. According to Baldridge and Burnham (1975), sex, age and personal attitude do not have as important an impact on an organization's innovation behavior as do the structural characteristics of the organization, but some individual characteristics, positions and roles seem to have an impact on the involvement of an individual in the innovation process. In addition, somewhat different optimal environments and climates may be required for maximizing the creative achievement of younger and older adults (Mumford and Gustafson, 1988). However, this study signifies that age would have the reverse influence on innovativeness as well as the studies of Pierce and Delbecq (1977).

Measurement, rewards, external demand and variety and autonomy of an individual's task did not occur in this study even though other studies indicated their significance (Axtell et al., 2000; West, 2001). Even though interviewees in Study IV had some opinions about rewarding, the opinions were not clear: whether a development task is part of your "normal" job, or, if it is an additional task, it should be rewarded separately. The general opinion was that money is not the best reward. In addition, employees on the shop floor complained that the suggestion schema and its rewarding system were not always equitable or that there was no rewarding of any kind. According to Vartiainen et al., (1999), equity as a basic rule of reward system, and the implementation process of the reward system seem to be the essential issues in rewarding, and rewarding indicates the organization's values as does resource allocation.

There are different factors that enable or disable creativity and innovation in organizations (Pierce and Delbecq, 1977; West and Farr, 1990; Axtell et al., 2000). However, this study seems to show that organizational factors, such as structured procedures and methods as well as communication, are crucial not only in implementation but also in idea collection. In addition, individual factors, such as leadership and active individuals, are important during the whole life cycle of ideas.

Innovations, critical factors and development culture

Some earlier studies (Bessant, et al., 1994; Ahmed, 1998, Tidd et al., 2001) emphasize that organizations need to build supportive culture to perpetually create innovation. According to West (2001), innovations occur only where there is a strong practical and cultural support for efforts to introduce new and improved procedures. Organizational culture is a holistic phenomenon and is founded on factors at different levels: implicit components refer to invisible basic assumptions, values, beliefs and norms, as well as explicit, visible artifacts (Schein, 1992; Ahmed, 1998).

A central question in innovation is to change aim from focusing effort on the next greater innovation to focusing on creating an environment that stimulates innovation (Ahmed, 1998). Focusing only on individual development and innovation projects leaves "passive" gaps between projects, whereas incremental development should be embedded into organizations' daily procedures, and its culture. In addition, despite the interest in the field of innovation, there is still a lack of research on management practices about innovation cultures (Ahmed, 1998).

The critical factors that emerged from Study IV (the structure of the idea life cycle, communication, activity of individuals, leadership, knowledge, participation, climate,

development resources, organization structure, training activities and definition of the roles of organizational members) seem to be quite consistent with the factors that support innovativeness in organizations (West, 2001), the dimensions of innovation culture (Ahmed, 1998), and the dimensions of the learning culture (Schein, 1992). Schein (1992) defines learning culture by using the dimensions and characteristics of the organizations and humans that are relevant to the capability of a culture to learn. In addition, learning culture is managing the contradictions of stability, learning and change (Schein, 1992), which are essential elements in innovation processes as well.

The factors that emerged in Studies II-IV seem to be the visible internal foundations of an organizational culture, which either enables or disables the life cycle of ideas depending on the level of these factors. The factors can be named as explicit variables, typical patterns of behavior (Ahmed, 1998), visible, internal variables, or artifacts (Schein, 1992) of the organizational culture that support or prevent the life cycle of ideas. In this thesis, the type of organizational culture that affects the life cycle of ideas is named "development culture", which is close to the definition of innovation culture (Ahmed, 1998).

Study IV showed that some factors varied between different departments either, enabling and disabling idea implementation, for example leadership skills and communication. This demonstrates that several different development subcultures can be found within a company. According to Kanter (1983), more collaborative management is needed to achieve the necessary integration between departments particularly in the implementation of process ideas. In addition, realizing and understanding the subcultures of these functions, and inter-group processes should be designed which allow communication and collaboration across strong sub-cultural boundaries (Schein, 1992).

4.3 Management of the one-unit and inter-unit idea life cycles (scope)

The first two research questions led to the results about different idea life cycles, which have partly different enablers and disablers. According to the findings of Study IV, there seem to be different life cycles in which the ideas with different scope proceed within the company. The life cycle of those ideas affecting only the people of one unit, and those, extending over unit borders including people from two or more units, involve different decision-making processes with decisions being made by different individuals or groups. In addition, results indicate that critical factors in the two cases are not identical. Innovations should therefore be divided into two categories according to their scope. Categories that arose from Study IV were as follows (Figure 4.2):

- Ideas focused on the activities of one's own team/unit ("one-unit idea life cycle"), e.g., improving work instructions or improvement in information flow between two task groups within one unit.
- Ideas focused on several units or the interfaces between units ("inter-unit idea life cycle") e.g., improvements in material flow in a business process, improvement in the production process between units or ideas to improve interfaces, co-operation and communication between two or more units.[2]

[2] To avoid misinterpretation, it has to be mentioned that "inter-unit ideas" are called "process ideas"in Study IV. In this thesis the term "inter-unit ideas" is used to make sure that it is not confused with the term "process innovations" presented in Chapter 1.2.1.

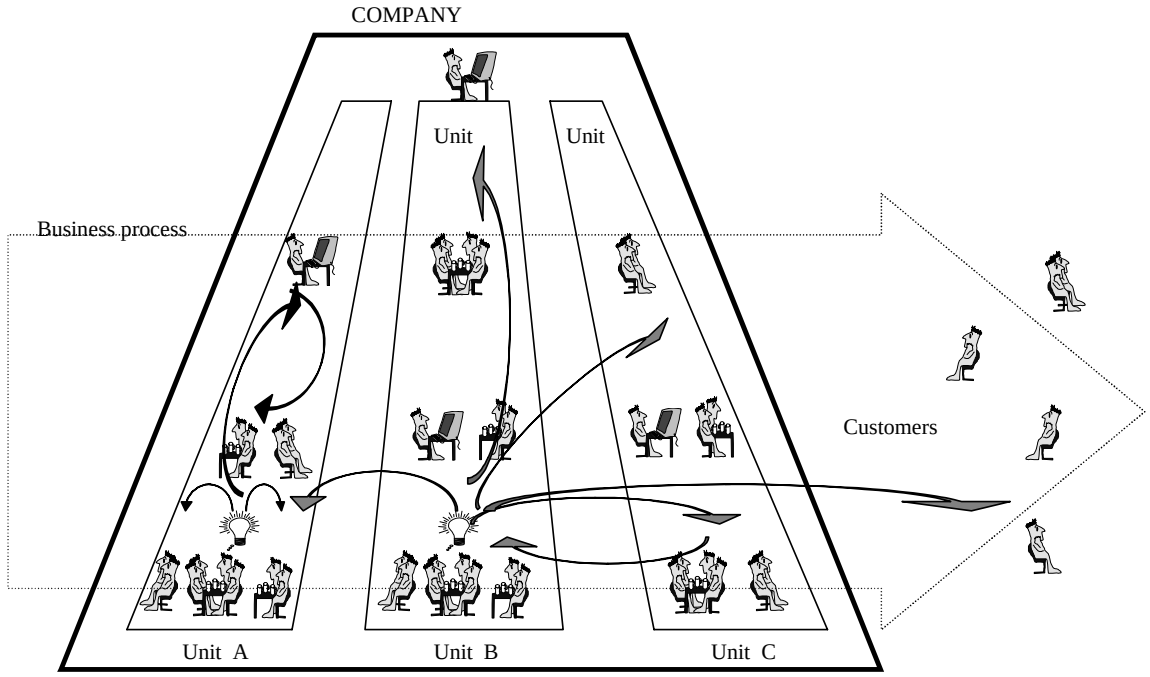

Figure 4.2 The “one-unit” idea life cycle in Unit A, and the “inter-unit” idea life cycle initially from Unit B

According to Study IV, it seems that companies have mainly developed a structure for handling “one-unit” ideas. Because the requirements to manage “one-unit” ideas differ from the “inter-unit“ ideas, the structure of handling “one-unit” ideas is not sufficient for the management of “inter-unit” ideas.

4.3.1 Similarities and differences

Study IV shows that the life cycle of “one-unit” ideas is not similar to the life cycle of “inter-unit” ideas. Comparing “one-unit” ideas with “inter-unit” ideas, there were some differences in the enablers and disablers, despite the fact that discussion was seen as an essential enabler for both. “One-unit” ideas could proceed more easily due to an active person(s), whereas the progress of “inter-unit” ideas needed a stronger and more defined handling structure, mutually approved rules or a formally founded project of implementation. Thus the implementation of inter-unit ideas needs a different organization structure: it needs stronger co-operation and formal structures between units while the implementation of “one unit” ideas benefit from the independence of the unit. Teams and their building (right persons) seemed to be important especially for “inter-unit” ideas (teams on concern level). To handle “one-unit” ideas, there were more often informal teams and meetings apart from the formal organization structure (Table 4.3). The essence of teams came out in other studies as well (Salminen, 1995; Lanning, 1996).

Table 4.3 Special features of “one-unit” and “inter-unit” ideas’ life cycles based on Study IV.

“ONE-UNIT” IDEAS LIFE CYCLE	“INTER-UNIT” IDEAS LIFE CYCLE
Features related to individuals: • Proceed more easily due to one active person(s) Features related to organization or group: • More alternative ways to proceed in the first phases (collecting, handling) • Existing examples of the idea and findings; handling procedures/structures • Independent units enable the life cycle • Informal discussions and teams enable the life cycle	Features related to individuals: • Importance of the commitment of top-managers • Need for knowledge about the whole business process/others’ tasks whom to contact Features related to organization or group: • Needs stronger and more defined handling structure, mutually approved rules • Implementation as project, where resources are defined • More time-consuming than implementation of one-unit ideas • Involves a larger number of people from different departments or units as well as higher hierarchical levels. • Need for open forums over the department borders to discuss issues, e.g., cross-functional teams or teams on a concern level • Defined targets of the process teams, holistic structure for process development

According to Study IV, even if some phases in the life cycle of “one-unit” and “inter-unit” ideas were the same, the two categories differed from each other at least in terms of idea collection, decision-making and implementation phases. For “one-unit” ideas, there seemed to be more alternative ways to proceed in the first phases than for “inter-unit” ideas. The implementation of “inter-unit” ideas (e.g., improvements in information flow or changes in the production process) was more time-consuming than for “one-unit” ideas. Decision making and implementation of these “inter-unit” ideas had to involve a larger number of people from different departments or units. This often meant that higher hierarchical levels were involved.

The implementation of many “one-unit” ideas seemed to occur without any formal decision, or a formal decision was made afterwards. The same phenomenon was sometimes found when talking about “inter-unit” ideas: changes in processes were first implemented informally right after a better working method or procedure had been found. The formal registration or decision took place later.

According to West (2001) the following factors in particular support process innovation: communication, team working, interdepartmental co-operation, centralized decision making, support for innovation, employee competence, and structure where someone drives ideas to top management as well as to the external environment and uncertainty. Process innovations also require the involvement and competence of several functions during the implementation process (Boer and During, 2001).

4.4 Simulation game method as enabling tool

4.4.1 Description of one enabling tool: the simulation game method

Various types of games have been used successfully both in teaching organizational operations and activities, for instance, production management or co-operation, and in industrial organizations as a part of a development project to meet the challenge of the integration of disciplines and of employees participation (Riis, 1996). Simulation games can be divided into two categories: general and company specific games (Forssén-Nyberg and Luhtala, 1996; Riis, 1996). These different kinds of simulation games have been used in several sectors and fields: in industrial organizations (Savukoski et al., 1995; Forssén-Nyberg and Luhtala, 1996; Riis, 1996; Zulch et al., 1998), office work (e.g., Ruohomäki, 1995b; Teikari et al. 1995; Piispanen et al., 1996a; Ruohomäki and Jaakkola, 2000) and in education for students (e.g., Jagues, 1995; Bourlés, 1996; Riis et al, 1998). The simulation game studied in this thesis is a participative, company-specific developmental and training tool which enables the development of a company's own business processes, for instance, an order-to-delivery, product development process or administrative processes (Piispanen and Pallas, 1992; Smeds 1994; Ruohomäki, 1994, 1995a, 1995b; Piispanen et al. 1996a, 1996b; Haho and Smeds, 1996, 1997; Haho, 1998). The simulation game method is also called the Work Flow Game (Ruohomäki, 1994; Piispanen et al., 1996a; Pankakoski, 1998).

In the studied cases in Studies I-III, the main aim of the simulation game method was most often to analyze the present stage of business processes and collect ideas from personnel for further development (in 22 cases). To train employees and spread holistic understanding about business processes, the simulation games were organized into 16 cases. They have been used rather often to test ideas as well, such as e.g., redesigned processes before implementation (in 10 cases).

Mostly the simulation game method was used as a part of the larger organizational development project, or as an individual project. In 11 cases the simulation game method was organized several times in different phases of the development projects for several purposes. Only in one case company was the method used as a continuous improvement tool.

A simulation game is like a “role-play”, and thus not computer-based game. In the game, employees “play” their own roles explaining their tasks, information and material flows as well as problems in the selected business process. The emphasis is on interaction and dialogue rather than on the playing of individual roles. The word “game” means that there are some rules that participants have to follow during the game. “Simulation” stands for modeling existing reality or planned future activities.

According to Studies I-III, the simulation game method consists of three main phases: (1) the preparation of the game; (2) the one or two-day game session; and, (3) the evaluation of the results. The simulation game can be used several times during the organizational development process for different purposes (see also: “Softmatch”- method, Haho and Smeds 1997). In the game, it was possible to analyze present state processes, to develop and test new process modes or routines of operation in simulation experiments before actual implementation.

Actually, analyzing the present stage started before the game session in the preparation phase. Preparation of the game included the data collection of the selected business process and selected real case examples (e.g., work-flow charts, material used in the process, realized

timetables and delays, customers claims) by founding the planning team and interviewing employees. In most of the cases, representatives of the employees from different hierarchical levels attended in a planning team. This participative planning team started initial knowledge and idea collection and, therefore, supported learning as well as orientation for further simulation. Interviewing employees facilitated their orientation and committed them to the simulation game as well as it orientated the game leaders on how to benefit from doing the interviews. If it was not possible to interview employees, the information needed about the simulation game session was spread to the participants by mail or in an invitation letter.

Each simulation game session took from one to two days, and there were typically 30-50 participants (Studies I-III). The participants consisted of representatives from each step of the simulated work-process and, if possible, also from related sub-processes and departments within the organization. Participants were divided into two groups: players and observers (Figure 4.3). In addition, the session included a game facilitator and a secretary. Players "played" their work roles explaining what they do and how, what information and material they needed to complete their work phase and what was their task and phase in the process chain. Observers commented, asked questions and actively discussed the process. The facilitator's role was to steer the game and collect participants' ideas and opinions; as well her/his focus was on debriefing, as opposed to teaching. In most of the studied cases, there was a secretary as well. The secretary took care of practical things during the game sessions and made notes. Sometimes the representative of an actual customer participated in the game session as a player with good experience. According to participants´ feedback, the biggest problem in a simulation game was that some "player" was missing and the process was not complete.

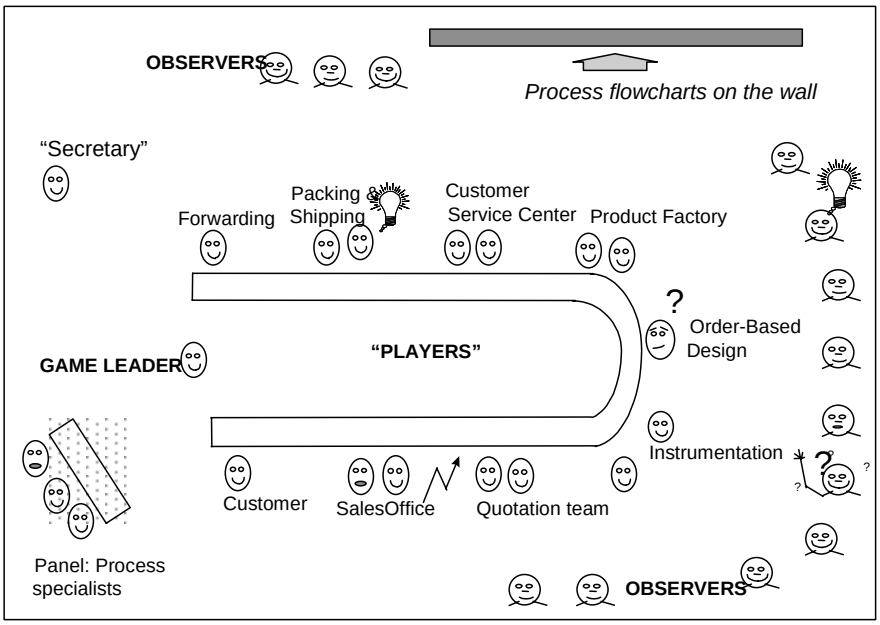

Figure 4.3 Example of a simulation arrangement (Study III).

The specialist panel was used in some simulation game sessions (in Study IV) where the new process models were tested or designed. A specialist, who had designed the process, sat in the panel answering the participants' questions about the process model and vice versa, getting

feedback from the participants. The mutual understanding of the business process improved between process specialists and employees.

During the game sessions, the participants brought up problems and development needs as well as new development ideas. When ideas were systematically collected, the number of ideas per person was higher, up to eight ideas per person. When there was no systematic idea collection the number was less than one per person. It was found in Study IV that the more systematically the ideas were collected, the better the participants' (tacit and explicit) knowledge and opinions could be documented. Ideas were collected systematically on the wall for all participants to see using "post-it" sticker papers or they were collected from all participants using special idea/comment collection forms in addition to a secretary who made notes. In the end of the simulation session the group work was organized. In these group works participants analyzed the actual case examples and the problems and compared realization, for example, to organizational vision or targets to reach a more detailed description on the state of the simulated process.

After a game session, an evaluation of the session itself and the results in terms of defined aims for learning and organization development was completed. When the aim of a simulation game is development and not just training, games should lead to further actions. Action points for future development were made either in the game session or in a separate meeting after the game session. It was found that if the simulation games were used recurrently, the method itself served as a follow-up tool.

4.4.2 Evaluation of the use of the simulation game

According to Studies I-IV, the participative and interactive simulation game method brings together knowledge of personnel from different vertical units as well as hierarchical levels. Through these means, it is an effective method to place employees' pieces of knowledge together and form a holistic picture of the whole business process, activities and problems.

The game sessions increased participants' knowledge of the process (learning effect) and brought up problems and development ideas. It was noticed while counting the number of ideas mentioned per person in Study III that a simulation game always brought up participants' points of view about problems, and development ideas as well. According to the short-term results of the studies, employees mentioned that the greatest advantage was that they learned to understand the business process better, as with one comment, "the simulation games created a holistic understanding of the lead times and problems in the order-to-delivery process; for the first time a complex process was understood as a whole."

Knowledge of personnel

According to Studies I-IV, the simulation game method has proven to be a very effective way of enhancing social interplay and organizational knowledge creation and learning, as well as a good tool for increasing a shared holistic understanding of the work process.

The results of the evaluation questionnaires (in Studies I-III) and interviews (in all four studies) indicate that the effect on individual learning was very strong. The holistic understanding of simulated processes, the over-all picture of the business process, different functions and interfaces was increased (Table 4.4). In addition, some remarkable issues were new ways of thinking, experience and learning to understand. According to Mumford & Gustafson (1988) innovative and creative people think globally instead of locally, seeing problems in a new way.

Since the simulation game method is a participative tool, the empowerment of employees allows both bottom-up and top-down interaction, because employees from different departments or organizational layers were involved. As Boer and During (2001) concluded: successful innovation requires a balance between top-down strategic drive and bottom-up emerged creativity. It was shown in Studies I-III that the simulation games met the challenges of being efficient communication channels (formal and informal) for knowledge sharing and above all for creating the knowledge in a shared mode within an organization and with clients or other external partners. Visualizing business processes in simulation games helped to define process problems together with employees. In the sessions, participants had a good opportunity to talk and *get to know people* from different departments and separate processes, and many organization or department specified terms and concepts were discussed, clarified and understood.

While envisioning "the ideal model" of the new process using the simulation game in the studied cases, the participants created new explicit knowledge, i.e., new process and organizational structures. This kind of organizational learning establishes new premises to overwrite existing processes or structures. This learning method could be seen as double-loop learning (Argyris and Schön, 1996).

Playing simulation games increases the perceived need for change and commits employees to implement changes. This is not achieved in the traditional approach, where outsiders or top managers manage changes. The generation of motivation and need is crucial for adoption of change (Van de Ven, 1986)

According to Klimecki et al. (1991) three conditions must be met before the step from individual learning to organizational learning can be taken: 1) Communication and mutual understanding, 2) Transparency: making the process and activities visible, and 3) Integration of group processes into the system, i.e., individuals must be able to integrate their action into the whole. The results from Studies I-III indicate that the simulation games enabled the fulfillment of these conditions.

From the above, we can conclude that the simulation game method promoted individual learning as well as organizational learning (both single-loop and double-loop or the three steps of learning), by enhancing communication, transparency of processes, and the integration of different activities. Thus it built better requirements for knowledge creation and innovation.

Generation of the development ideas

The simulation game reliably generates a vast amount of new development ideas and open questions as well as problems about the business process. Thus, separate, time-consuming analyses and brainstorming sessions are avoided. Studies I-III revealed that the number of ideas, questions and problems did not depend on the scope of the simulation games used; training-focused simulations produced ideas almost as much as developmental cases, with only the content varying. When employees presented and discussed development needs, it raised the understanding of problems and increased improvement expectations.

In each simulation game session, people mentioned many problems and development needs (Table 4.4). It was found in Study III that the more systematically the ideas were collected, the better the participants' (tacit and explicit) knowledge and opinions could be documented. The number of collected ideas in simulation games varied depending on the idea collecting method and system. The number varied between 0.6 and 8.1 ideas per person. The more structured the collecting method used was, the more ideas were collected despite the initial target of the simulation game. In half of the cases, companies made decisions on action plans even though

the initial aim of the game was training. For the most part, the method awakened organizational and process ideas though also some product ideas, but only a few.

Table 4.4 Summary of the underlying features of the method and results based on Studies I-IV.

Features, underlying phenomenon	**Short-term Results**
• Participation (Hackman and Oldman, 1980). • Integration of different activities, tasks, units, hierarchical levels. • Visualizing, concretizing, verbalizing the business process, making invisible knowledge visible. • Place for discussion is offered, "BA" place for sharing knowledge (Nonaka and Konno, 1998). • Interplay of tacit-explicit, between tacit/ procedual and explicit /declarative (Anderson, 1980; Nonaka, 1994). • Often the use is built into a project mode, controllable. • Systematic idea collection. • Experimental learning, reflection (Kolb, 1984). • Learning from mistakes (Holman et al., 2000; Boer and During, 2001). • Double-loop learning (Bateson, 1972; Argysis and Schön, 1996).	• Improved holistic view from pieces of knowledge and information. • Shared, mutual understanding of the whole work process, transparency of processes. • Development ideas, list of problems. • Increased organizational and process but also some product ideas. • Enabled primary inter-unit idea processes. • Clarified structures and roles. • Enhanced communication. • Getting to know each other. • Increased commitment and motivation toward the implementation of change. • Action plans for process and organization development. • Plans and different solutions tested. • Led initially to incremental change.

The method seems to enable above all the progressing of "inter-unit" ideas. The method seems to improve the requirements: it increased the holistic understanding of the process among organizational members. It also offered an open forum for discussion over the "unit borders" clarifying at the same time terms and rules. Games involved people from different hierarchical levels and functions as well (Table 4.4).

Soft issues like shared knowledge creation and an open atmosphere are important parts of the commitment process and act as a basis for development. The general level of knowledge and understanding, the atmosphere, communication and co-operation, mutual goals and terms for shared visions were built up in the simulation games by dialogue and through participation. The simulation game was, however, just one tool; other tools, structures, and methods are needed to support idea implementation according to Studies II-IV.

5 Conclusions and discussion

This thesis focused on the life cycle of "bottom-up" ideas: creation and development "bottom-up" ideas, their implementation into innovation and evaluation processes, as well as on the enabling and disabling factors of the life cycle. The data was collected from the 17 companies where a participative development method, a simulation game, was used. The data is presented in four separate studies, Studies I-IV. The three main research questions were:

1. How is the life cycle of bottom-up ideas managed in organizations?
2. What factors enable or disable the life cycle and the implementation of bottom-up ideas?
3. How is the participative simulation game method used in the life cycle of "bottom-up" ideas and innovations, and what is achieved?

To manage the complex, social, context-sensitive, life cycle of bottom-up ideas successfully, this study proposes the following conclusions.

5.1 The life cycle of "bottom-up" ideas

5.1.1 Management of the life cycle of bottom-up ideas

The study shows that one remarkable reason why ideas "vanish" is the lack of management structure for the life cycle of "bottom-up" ideas. Organizations could take the stand that this process would be as manageable an issue as the new product development process.

A holistic approach to manage the knowledge of personnel in terms of innovation is needed. The knowledge of personnel should be seen as an essential organizational resource, which can be developed and managed as well as new product development processes. The life cycle of ideas and its management should be regarded as a vital organizational process on the whole as well as a continuously improving procedure. An integrative approach to the management of innovation is required, i.e., feedback, structures, and processes that support innovation (Tidd et al., 2001). Thus this thesis has shown the following development needs in terms of improving the life cycle of ideas in organizations.

Firstly, to ensure the *holistic understanding of the management process of the "bottom-up" ideas*, it should be understood that the life cycle includes the following processes, which seem to have phase-specific problems: *firstly*, development and generation of ideas, i.e., the creativity process, and *secondly*, implementation of ideas, i.e., the innovation process. In the implementation of ideas in particular, management as well as supportive structures and tools need to be improved or totally rebuilt. In addition, it is essential to improve the management of *the third process* of the idea life cycle: evaluation, follow-up, and feedback, at which management seems to be very poor in organizations. Thus, the possibility to learn from the past and mistakes is lost. (Figure 5.1)

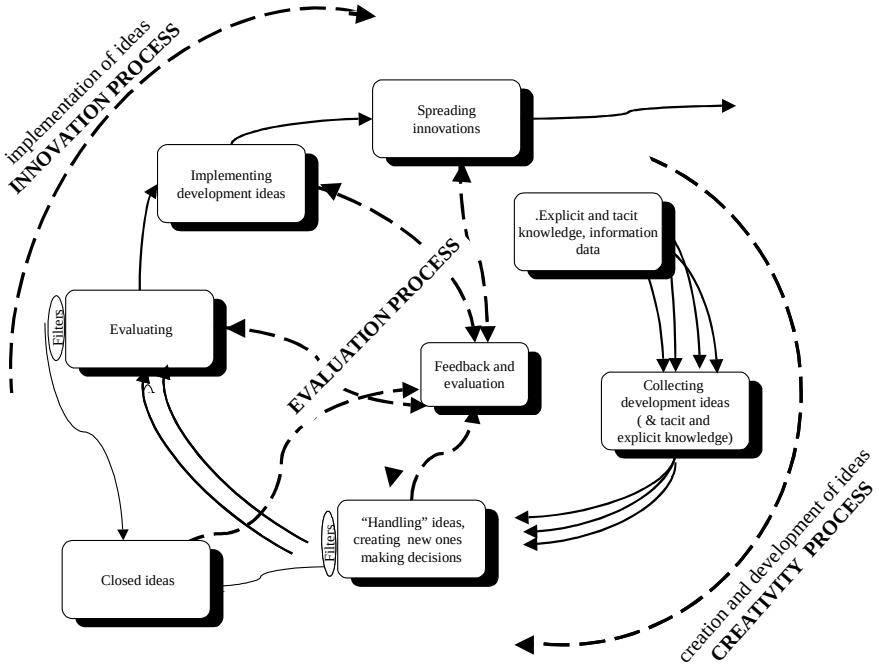

Figure 5.1 The holistic understanding of the life cycle of ideas: the essence of managing creativity, innovation and evaluation processes.

Secondly, in addition to earlier literature, which shows that innovations with different focus (Kimberly and Evanisko, 1981; Boer and During, 2001) and scale (Ettlie et al., 1984; Ekvall, 1996) do not have identical requirements, this study shows differences between different types of ideas and innovations in terms of the scope. It was found out that instead of talking about small and large scope, the scope could be divided more precisely into two categorizes. Ideas and innovations should be categorized and their life cycles managed *in terms of the scope: 1) an individual unit, " one-unit" ideas; and, 2) several units and interfaces between them, "inter-unit" ideas.* This categorization is based on the finding that handling and procedures with decisions being made by different individuals or groups as well as facilitating and preventing factors are partly different in these two categories. (Figure 5.2)

This study emphasizes the essence of understanding different requirements to manage "one-unit" and "inter-unit" ideas successfully. It seems that companies have mainly developed the structure for handling "one-unit" ideas. Because the requirements to manage "one-unit" ideas differ from the "inter-unit" ideas, the structure of handling "one-unit ideas" is not sufficient for the management of "inter-unit" ideas. Therefore, more development and utilization of the concrete, innovative tools (in addition to the simulation game method) to improve *the life cycle of "inter-unit" ideas* in particular is needed.

In addition, the management of different types of innovations, *process and organizational innovation processes*, also need different approaches to be successful. Organizational innovations seem to be more difficult to implement and were more time-consuming than technical process ideas. Long-term view is needed at the management level to replace the pressure of quick fixes, especially in the case of organizational innovations (Damanpour and

Evian, 1984; Van de Ven, 1986; Zemke, 1999; Boer and During, 2001). Short-termness seemed to be symptomatic of a lack of strategic thought and a mechanistic view of organization (Holman et al., 2000), which can be defined as invisible dimensions in the culture. To realize or change a learning culture, for example, is difficult and time-consuming (Schein, 1992; Holman et al., 2000).

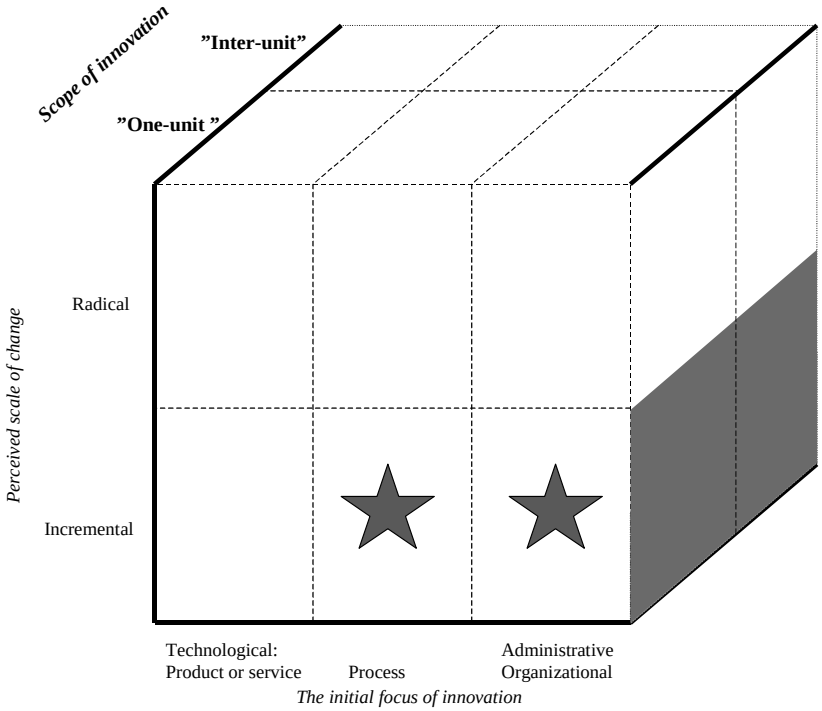

Figure 5.2 The scope of ideas and innovations: "one-unit" or "inter-unit".

5.1.2 Definition of innovation in literature

The literature review indicates that *most of the studies do not specify either the type of innovation they are studying* (neither in terms of the scope, focus nor scale) *or the sub-process of the idea and innovations life cycle* (creativity or innovation). This might indicate the problems of ambiguous interpretation of the term "innovation" and of developing a cumulative knowledge from the studies. This and some earlier studies appear to demonstrate the critical factors for these different types of innovations, and for creativity or innovation processes, are not the same. This leads to the conclusion that in research, the innovations studied should be better described in terms of the type. Otherwise the results are difficult to interpret and hard to compare with other studies. As Wolfe (1994) suggests, researchers in the complex and context sensitive field of innovation theories must clearly address the stream of innovation research, the phase of the innovation process he/she is focusing on, the type of case organizations, the conceptualization of the study's outcome factor and attributes of investigated innovations.

5.1.3 Enabling or disabling factors in the life cycle - individual and organizational factors affecting innovations

This study suggests certain organizational and individual factors that enable or disable the life cycle of ideas i.e., affect creativity and innovation processes. In addition to earlier studies this thesis bore two conclusions:

- *Organizational factors*, e.g., structured procedures to collect ideas, and formal teams to enable idea creation and communication (e.g., "inter-unit" ideas and teams at the company level; knowledge creation needs interaction between tacit and explicit) are *important in the creativity as well as in the innovation process*.
- *Individual characteristics can be divided into two levels; of the shop floor and management*. Individuals on the shop floor, with their personal characteristics affect the level of creativity (e.g., to current ideas), but the personal capability and characteristics of an individual manager strongly affects all phases. Leaders have the main responsibly for creating those enabling structures and the whole development culture and thus are the critical factors during the whole life cycle of ideas, although that is not to diminish the importance of active organizational members and champions.

This study underlines the importance of organizational and group factors in terms of a successful life cycle of ideas. In addition, the results of Study IV show that although the number of critical organizational success factors is large, the essence of some individual factors, such as leadership and active individuals, are crucial during the whole life cycle of ideas (Figure 5.3). The literature has had a slightly different emphasis, noting that latter phases need more organizational characteristics than do individual ones and vice versa (Axtell et al., 2000; Tidd et al., 2001; West, 2001).

Most enabling and disabling factors are "soft" issues and as well, the idea and innovation process is mostly a social, interactive process between people. Two basic axioms about human behaviour are, firstly, that human beings explore and manipulate their environment in a creative way when they have appropriate circumstances, an appropriate level of stimulation and sufficient security (West and Altink, 1996). Situations, where different assumptions operate either because we do not understand what is going on or worse, misperceive and misinterpret the actions of others, are uncomfortable (Douglas, 1986; see Schein, 1992). On the other hand, external and internal information about technological, economic and social changes affects the decision making of managers as a factual premise and, on the other hand, the culture as a value premise (Urabe, 1988). Invisible values and underlying assumptions lay the foundation for culture, and furthermore, for the decisions. Institutional leadership is critical in creating a cultural context that fosters innovation, and in establishing organizational strategy, structure, and systems that facilitate innovation (Van de Ven, 1986; Ekvall, 1996). Without the intervention of leadership, structures and systems focus the attention of employees on routines, not innovative actions (Van de Ven, 1986). Managers have an essential role in creating the requirements for the creativity, innovation, and evaluation processes, for example, pace and time for a team meeting, for instance, where ideas can be explored. Therefore, managers and decision makers should be aware of their own values, basic assumptions and "human image". In addition, to understand and guide human reactions, conflicts and interpersonal relations, which occur in innovation processes (Zaltan et al., 1984), one must understand and experience those within oneself (emotional intelligence), not only intellectually.

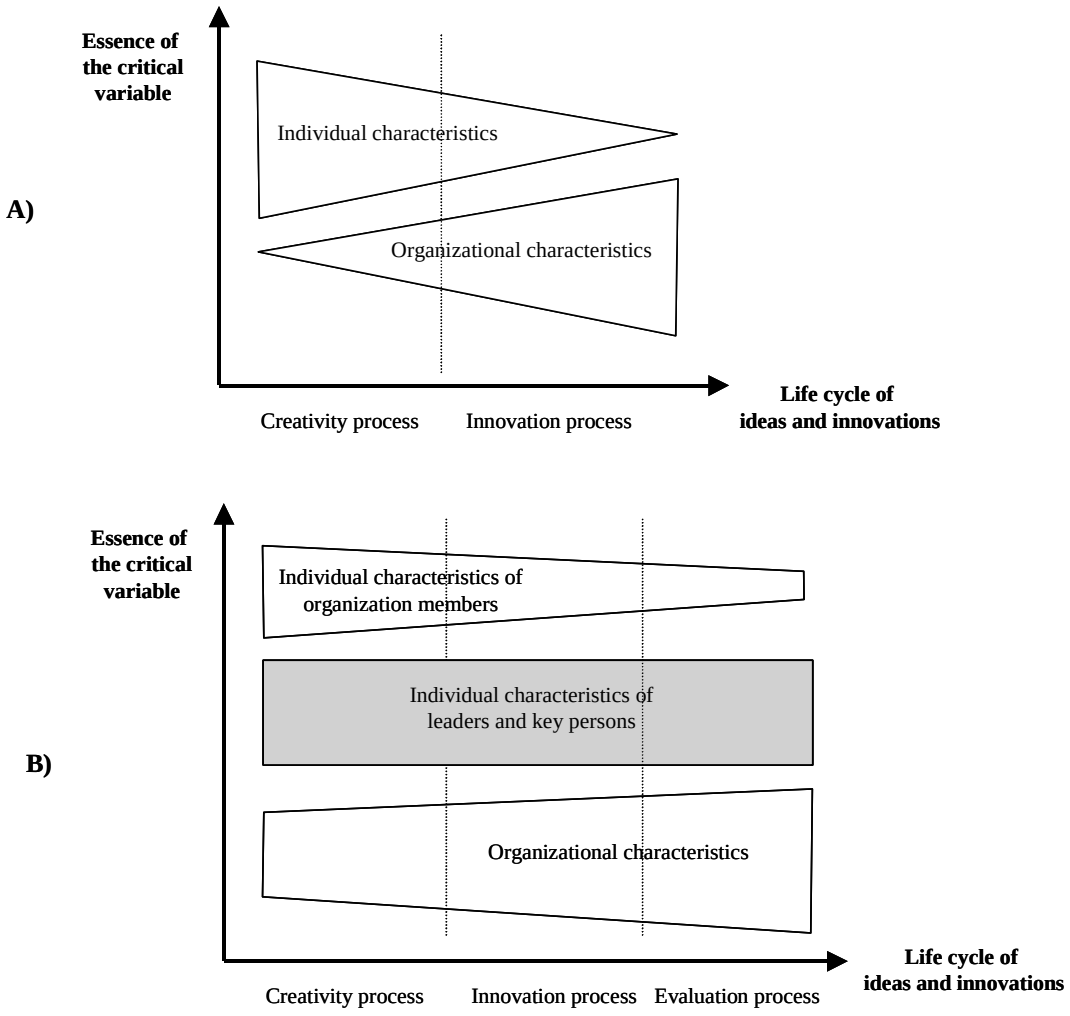

Figure 5.3 The conclusions of the importance of individual and organizational characteristics in (A) earlier literature and (B) in this study.

Thus, the role of top managers and key persons is crucial, and most evidently managers and key persons should be *individually supported*. Because an innovation process is always a social process, managers should have supportive methods to improve and highlight not only organizational factors, such as an organization's processes using simulation games but also individual capability to handle interpersonal relations and to deal with conflict between people and within oneself. Facilitating education for managers is needed. Holman et al. (2000) show that managers would need more education not with the extent of but with the type of education they are receiving. *Management education* should focus more on the practices of managing through the use of experientially-based teaching practices. I suppose that more experimental tools that affect both emotional intelligence and cognitive intelligence, which have been used more in social work, are also required in industrial organizations (work guidance, socio-, and psycho-dramas).

5.1.4 Development culture embedded in critical factors

Focusing on one single critical factor or creation of new innovations in not adequate for the successful innovation process. Incremental innovation needs an underlying supportive culture and innovation climate (Bessant et al., 1994; Ahmed, 1998, Tidd et al., 2001). The enabling and disabling organizational and individual factors of the life cycle of ideas (Studies I-IV) could be categorized, referring to Schein (1992) and Ahmed (1998), as necessary but not as sufficient visible factors in the development culture. In other words, development culture is a type of organizational culture, the dimensions of which affect the life cycle of ideas.

Because culture is built on different elements and is strongly affected by leaders, culture varies between units and organizations (Schein, 1992) and therefore can also change over time (people changes, other changes) as shown in Study IV as well. The culture itself undergoes changes, though very slowly, under the impact of changes in these technological, economic and social factors.

In addition, organization development culture was not homogeneous in the case companies. There are always subcultures, sometimes simply different from the organization as a whole, sometimes in opposition to it. In organizations, which have different cultures and basic assumptions, same artifacts can mean different things and lead to different results: participation for one. Thus the same factors can be either enablers or disablers and thus define the level or type of development culture, basic values and leadership skills for that unit or organization. Lillrank and Kostama (2001) identified four ideal types of cultures in their studies and found that quality policies, evaluation and training methods need to be developed separately for each culture.

Finally, it has to be taken into account, that all the case studies of the thesis were from the same national culture, Finland. It has been found in innovation management that national culture may affect organizational cultures even more strongly, and successful management practices have to fit with national culture, for example, Nordic countries have a lower need for control, which tends to support bottom-up innovation (Smeds, 1997; Hoffman, 1999). *The results lead to the conclusion that the successful use of bottom-up ideas needs to have a supporting development culture and it is essential to understand the underlying critical factors of organizational development culture and its sub-cultures at least at the management level.*

5.1.5 Simulation game method in the context of ideas

The social simulation game is a participative, tailored developmental and training tool, which enables creativity and innovation processes to some extent according to this study. The method seems to enable the creativity and innovations of inter-unit ideas, improving the requirements and creating mainly organizational and process ideas.

Simulation games are effective tools for creating, testing and spreading bottom-up development ideas. The simulation game method has proven to be *a very effective way of enhancing social interplay and organizational knowledge creation and learning*, as well as a good tool for increasing a *shared holistic understanding of the work process* and improving mutual understanding of terms used. The simulation method combines both the horizontal functions and vertical levels of the organization. Organizational members from different horizontal departments and vertical levels were involved. This dialogue between organizational levels and functions for process innovation is crucial (Smeds, 1997). In addition, real case examples were used as the basis for simulation as well as the comparison that was made between operative tasks, while organizational vision strengthened and improved the development of the holistic

picture. The improvement of organizational members' holistic picture of the business process is seen as an important requirement for innovation (Wenger, 1998). This leads to double-loop learning where, e.g., problems and contradictions within tasks and methods for instance, lead to a questioning of the rules (Bateson, 1972; Argysis and Schön, 1996)

The more people internalize the work process, the higher the level of knowledge creation they achieve (e.g., from communication to co-operation, from understanding the process to understanding each others' opinions). Thus, the simulation games are more than process development and training sessions: they create a shared understanding of related knowledge around the business environment and thus break the stability of an organization and form a platform for evolutionary management (Smeds, 1996). Simulation games improve mutual understanding or communication, which *can influence the invisible levels of development culture* (values, assumptions) and therefore *improve not only the life cycle of ideas but also development culture*.

In addition, the simulation game *reliably generates a vast amount of new development ideas*, open questions, and problems about the business process. Still the simulation game is just one development and learning tool whose effectiveness is related to organizations' current development and implementation ability. The simulation game is fundamentally based on the soft factors (participation, communication, integration, experience) that form a vital base for bottom-up development in an organization. If the culture does not support the use of the method, the results are not necessarily successful.

5.2 Theoretical contribution

According to earlier studies both bottom-up development and top-down strategic drive are needed in product, process and organizational innovation processes. However, bottom-up ideas are not always successfully used and managed; the need for study more on organizational and process innovations is prevalent as well. The focus of this thesis was not to compare the bottom-up, middle management, and top-down approach or product, process and organizational innovation. The thesis was focused on producing new knowledge on the life cycle of bottom-up ideas concerning process and organizational matters, and the management as well as enabling and disabling factors of this life cycle. The theoretical contribution of this thesis is fivefold.

Firstly, these findings give a new understanding to *the proceeding and management of bottom-up ideas* from idea creation to their implementation and evaluation in organizations (Chapter 4.1). An innovation process is a social process including learning. Learning though contradictions, evaluation, and feedback (e.g. Engeström, 1985; Argyris and Schön, 1996) is essential and should come up more in the management of innovation and should be included in the phase models as the results show (Chapter 5.1.1). However, it seems that earlier phase models of managing change and innovation processes (e.g. Zaltman et al., 1984; Wheelwright and Clark, 1992; Deming, 1994; Vartiainen, 1994) have not been built on learning models although the models have been interpreted afterwards though learning theories. Therefore, the model of the life cycle of bottom-up ideas differs from earlier innovation management, and organizational development phase models, in that it emphasizes consciously learning aspects and more strongly, evaluation and follow-up throughout the whole life cycle. The first contribution of this thesis is thus the creation of *the holistic life cycle model of bottom-up ideas*, which includes three main specific sub-processes. The sub-processes are creativity, innovation and evaluation, of which all have to be managed in terms of successful incremental innovations.

Secondly, in addition to the definition of the scope of innovation (Zaltman et al., 1984), the thesis also contributes to the area of innovation management showing different requirements

for the management of ideas depending on *their scope, defined as "one-unit" and "inter-unit" ideas*. In addition, the thesis showed the need to develop the management of "inter-unit" ideas. (Chapter 4.3 and Figure 5.2)

Thirdly, because the life cycle of ideas includes the learning process, an organization's capability to innovate can be recognized through organizational and individual factors and its development culture. This thesis produced new knowledge about *organizational and individual factors affecting the life cycle of bottom-up ideas*. The thesis defined enabling and disabling factors as follows:

- the phase-specific disabling factors in the life cycle of ideas (in creativity, innovation and evaluation processes) (Table 4.1),
- the roles and essences of organizational and individual (i.e., individual characteristics of organizational members and leaders) factors in creativity, innovation and evaluation processes of the life cycle (Chapter 5.1.3),
- the disabling and enabling factors of "one-unit" and "inter-unit" ideas (ideas with different scope), that are not similar (Chapter 4.3.1 and 5.1.3), and
- the critical internal organizational and individual factors that affect the entire life cycle of ideas (Chapter 4.2).

Furthermore, this thesis produced new information in the field of organizational culture. In addition to the earlier studies on learning culture (Schein, 1992) and innovation culture (Ahmed, 1998), in this thesis, *"development culture"* is defined as one type of organizational culture. Supportive development culture includes the enabling critical organizational and individual factors mentioned in Chapter 4.2, which affect the successful life cycle of ideas. The empirical findings showed how critical factors and thus the development cultures could differ not only between organizations but also within one organization from unit to unit (Chapter 5.1.4).

Finally, the life cycle of "bottom-up" ideas involves learning and therefore innovative learning methods are required. These findings can be of value when considering *the role and use of the simulation game method in terms of innovation*. Learning models (Engeström, 1985; Nonaka, 1994; Argyris and Schön, 1996) emphasizes learning through interactions, contradictions, evaluation, reflection and feedback, and the simulation game methods represent as well as enable this kind of learning. In addition to the learning and development effects reported in earlier studies (e.g. Ruohomäki, 1995b; Piispanen et al., 1996a; Haho and Smeds, 1997), the thesis shed new light on how the method produced a special long-term-rise, improving the underlying critical factors of the development culture, such as communication or holistic understanding of the business process, by vertical and horizontal dialogue between tacit and explicit knowledge (Chapter 5.1.5).

5.3 Theoretical contribution in the local, practical context

The theoretical contribution in the local, practical context is related to the following issues. Firstly, the thesis increases *awareness about*

- *the management of organizational and process bottom-up ideas and*
- *the essential role of development culture* in terms of the successful life cycle of ideas

within companies. To be aware of these issues and to start discussions centered around the subjects is the initial and essential starting point for analyzing and developing the life cycles of ideas and development culture. In the long-term interviews, many interviewees mentioned that this was the first time they realized that organizational ideas could be managed.

Secondly, the companies should *pay attention to their own idea management systems and the realm of the innovation*. The following questions can be asked to analyze the idea management as well as the understanding of innovation in the companies based on the thesis. Does the company have any formal management procedures, methods, and tools to manage the life cycle of bottom-up ideas, and if so, what kind of structures and methods (Chapter 4.1)? Are these structures only for product innovations and "one-unit" ideas? Does the company manage organizational and process innovations or "inter-unit" ideas at all? According to this thesis, "one-unit" and "inter-unit" ideas need partly *different formal structures* to support necessary communication and the life cycle of ideas (Chapter 4.3).

Furthermore, the results of the critical factors can be used as a *"guiding check-list" for a company to evaluate whether their organizational development culture supports* incremental bottom-up development or not. What kind of enabling and disabling factors exists in both organizational and individual levels in the company and in its different units (Chapter 4.2 and Table 4.2)?

Finally, the practical contribution includes the more indepth experience of the use of the participative method, which enables the creation and implementation of "inter-unit" ideas. The thesis provides *descriptions of the use of the participative simulation game method and the results achieved* from developing organizations' business processes and training employees (Chapter 4.4). The description includes 90 simulation games in 33 development and training projects in 17 industrial companies, providing perhaps a more comprehensive understanding of the usage and results of the method in industrial companies than does the single case or comparative two-case studies that have been more common in this area (Table 3.1). In addition, an innovation process is always a social process. Therefore, the need for experimental tools to improve top-managers' and key persons' capability to handle interpersonal relations and to deal with conflict between people and within oneself is highlighted in the Conclusion (Chapter 5.1.3).

5.4 Validity and reliability of the methods, data and conclusions

This thesis is based on case studies, carried out mainly by the action research method (e.g. Argysis et al, 1985; Gummesson, 1991) and the building theory (Eisenhardt, 1989) moreso than the testing theory, which is the mainstream approach. That is why it is arguable that the validity of the conclusions of this thesis are not to be evaluated as in mainstream research (Kvale, 1989; Gummesson, 1991). However there are many potential sources of bias and invalid qualitative interpretations. To evaluate the validity, I use criteria for qualitative studies defined by Miles and Huberman (1990). They have emphasized that there are no strict canons or rules in qualitative research to indicate whether findings are valid and procedures robust. Therefore, they set the check-list for testing and confirming qualitative research findings and conclusions. The check-list includes twelve tactics. The first four tactics (1-4) aim to assure the basic quality of the data. The tactics from five to seven (5-7) check findings by various contrasts. The following four tactics (8-11) aim to take a skeptical, demanding approach to emerging explanations. Finally, the last (12) validate a conclusion by focusing on the feedback from informants. The tactics are:

1. Checking for representativeness, e.g., are the interviewees typical? What is the representativeness of the data?
2. Checking for researcher effects.
3. Triangulation, e.g., does data include different methods and different hierarchical levels? Are there different sources of evidence?

4. Weighting the evidence, e.g., informant, and circumstances of the data collection.
5. Contrasts/Comparisons between two sets of things.
6. Checking the meaning of outliners e.g., are there any exceptions?
7. Using extreme cases, e.g., are there any extreme situations or persons?
8. Ruling out spurious relations.
9. Replicating a finding.
10. Checking out rival, alternative explanations.
11. Looking for negative evidence.
12. Getting feedback from informants.

Validity and reliability in this kind of study are related to each other, and to differentiate them totally is impossible. The assumption, that the scientific findings can be duplicated under identical conditions (i.e., reliability) is an illusion. In both social and natural sciences we can never avoid changes in conditions or measurements (Enerstvedt, 1989). However, the qualitative research can have more reliability than validity (Grönfors, 1982). To check reliability one must pay attention to the following issues: the consensus of researchers (internal reliability), and the collection of results using different methods or asking about the same issue several times.

Checking for representativeness: The informants were typical organizational members from different parts of the companies' business processes. Informants were co-operative and the interviewees organized enought time for interviews. Studies I-III were done with other researchers. The studies compared different case companies and business processes, and the conclusions were drawn conjointly. The results of Study IV, even though done individually by the author, were evaluated with the colleagues in joint meetings, and conclusions about the classification of the results were greatly discussed, which also confirms the *internal reliability of conclusions.* In addition, external assessors have evaluated the data, i.e., Studies I-IV in the review process of the book and the journals.

In *checking for the researcher effect*, the following remarks were noted. Since this thesis is based mainly on action research, the author was able to spend time, discuss and get to know people, terms and concepts in 19 cases (9 companies). The other co-writers of the studies did action research as well and spent time in the rest of the companies. This participation most probably improved trust and openness, especially in the interviews. The researcher had same influence on interviewees even when the study was not being action researched, because the companies had been involved in action research in earlier phases of the studies. The researcher underlines that interviews also acted as a kind of intervention; the interviewees become conscious of phenomena (management of bottom-up ideas) they have not focused on previously.

Thus, focusing on the *triangulating*, firstly, the data includes a large number (33) of case projects performed in 17 companies. The data consists of case companies including people from all hierarchical levels. Secondly, several data collecting methods (mainly interviews, questionnaires and note-making) were used to collect information about the subject at hand. Interview data was not collected systematically in all four studies included in this thesis. Short-term interviews were only partly taped and typed, and, therefore some data could have been missed. Long-term interviews were taped and typed, but only interviews in Study IV were analyzed using the software tool "Atlas.fi". This was because the amount of data was so large and difficult to handle, classify and analyze manually, as in Study II. In addition, the semi-structured interview questions were not identical in Studies II and IV. In Study II, the interview

was shorter and more limited. Despite these differences, the analysis of the data mainly followed the same procedures. However, despite the fact that the interview questions, recording and analyzing tools of interview data varied from one study to another, interviews seem to be a useful method in this kind of research where the aim is to generate knowledge and not to test knowledge.

The same semi-structured questionnaire was used in 17 cases (Studies I-III). The rest of the cases were studied by using open short-term evaluation questionnaires with three to four open questions, except in case 1 in Study I, where no questionnaire was used. No quantitative analysis for validity was done, and questionnaires were analyzed in a qualitative manner. Both kinds of questionnaires brought up the same kinds of issues for the subject matter, which reinforces the *reliability of the conclusions*. Note making during the development and research process as well as from simulation games and evaluation meetings organized in half of the simulation games was done by the author in Studies I-III. This research diary was the author's personal tool and was descriptive including notes from discussions and observations the author made on site. The secondary data collection method, documentation and videotaping, were used mainly to check facts given by informants, such as, details about formal handling procedures, or to check the course of events in simulation games.

Data for research question no 1, concerning the life cycle of ideas, and the enablers and disablers of the idea and innovation process was gathered from all cases. Data for question no 2 was collected from all cases expect cases 1-2. Even the main data for both questions comes from the long-term evaluation of two case companies studied in Study IV. Data from these two different companies (manufacturing and R&D) included interviewees from every part of the entire business process and all hierarchical levels. Data for the last research question about simulation games is based on Studies I-III, which includes concurrent cases.

Weighting the evidence: The informants were close to or working in the process, (or setting the life cycle of ideas) with which I was concerned. The circumstances of the data collection were strong: the data, especially interviews, were collected later, after repeated contacts and interviews were made with the researcher. In addition the data was collected in official and formal settings. Representativeness, researcher effects, triangulation and getting feedback from informants affect the quality of data, and these issues are evaluated separately in this text.

Contrasts/Comparisons: The comparison was done in Studies III (training and development cases) and IV (Companies A and B). In the thesis, the characteristics of the creativity, innovation, and evaluation processes were studied as well as the differences between the life cycles of "one-unit" and "inter-unit" ideas.

One of the weaknesses is that all the case companies are more or less from the industrial field, and no outmost case companies were involved or studied. The results from the office and administrative work (e.g. Ruokomäki, 1995; Piispanen et al., 1996a; Pankakoski, 1998) support findings about the simulation game and thus increase their validity. In addition, the findings of large surveys with a great number of cases from the health care and broadcasting fields (West and Andersson, 1996; West, 2001) are parallel with the results of research question no 2, which also confirms the *reliability of conclusions*.

Checking the meaning of outliners: There were no significant outmost cases or outliners in the data. However, it was noticed in Study IV that some of the same critical factors of the life cycle of ideas varied between different departments either enabling and disabling idea implementation. This demonstrates that several different development subcultures can be found within a company.

Using extreme cases: In a way, this is another style of differentially weighting evidence (Miles and Huberman, 1984). However, there were no extreme cases in the study. Therefore, it would

have been interesting and probably useful to add case companies which would have been either on the edge of adjudicative bankruptcy without any clear external cause, or would have been a quick success story.

Ruling out spurious relations: because the external, environmental factors were excluded, this might have led to spurious relations or stress on founded critical factors. In addition the relations between critical factors were not studied, even if the relations can most probably be found. Therefore, it cannot be stated that the founded factors are independent.

Replicating a finding: The simulation game method was studied in many cases using questionnaires and interviews as data collecting methods, and the findings were replicated in Studies I-III. In addition, the co-writers reproduced part of the findings. The data in Study IV was first collected in one company, and after the initial findings the interviews in the second company were made. The findings were parallel.

Checking out rival explanations: The findings showed different critical factors – alternative explanations, which affect the life cycle of ideas. The discussion included some prioritizing and classifying of these rival explanations, as well as findings about separate factors and their importance.

Looking for negative evidence: This is a more extreme version of looking for outliners and for rival explanations (Miles and Huberman, 1984). There were no data, which would not support the conclusions. That is also because the conclusion does not aim to express an unambiguous truth and fact, but rather the complexity of the studied phenomena, i.e., the life cycle of ideas and factors affecting the life cycle. However, varied evidence was found in the earlier literature about some individual critical factors, for examples, rewards (Klein & Sorra, 1996; West, 2001) and age (Baldridge and Burnham, 1975). One weakness in this kind of theory building approach is that this empirical evidence leads to many theories, which at some points seemed to be overly complex. There were many courses and areas about which I had to made decisions. I had chosen another emphasis I could have ended up with slightly different results. However, that does not mean that one of those choices would have been "more truthful" but rather like looking at the same picture from a slightly different angle.

Getting feedback from informants: When departing from the correspondence criteria of truth as the sole basis for validation, the dialogue becomes central (Kvale, 1989). Therefore, the summaries of the interviews and questionnaires, as well as Studies III and IV were sent to the participating organizations' members and in some cases a discussion meeting was organized to validate results. Thus, the feedback from the informants was received during the research process.

5.5 Future challenges

The factors that emerged in this study are not necessarily the only or even the most relevant dimensions of development culture, even though there is strong support from earlier studies. Therefore, *the enabling and disabling factors should be further studied*. Further studies should also meet the challenge to define the critical factors of the development culture more precisely as well as the relationship between the critical factors. To explore the effects of national culture on development culture, studies should be conducted in organizations within the same national culture as well as comparing organizations from different national cultures. In addition, the r*ole of external factors should be compared to internal factors* in terms of "bottom-up" development. Which of those are the most critical? What kind of internal factors are needed when external uncertainty increases?

How do you recognize the quality and novelty of the bottom-up ideas and *filter the best ideas*? How do you facilitate the internalizing of strategy and targets so that the development activities focus on the same direction, and filter the best ideas along with the others? Measurements used in an organization reflect the strategic objectives and values of the organization. Therefore, measurements should lead organizational members in the same direction and help to prioritize the tasks as well as ideas. It leads to another question. How is the *measurement* used to improve the life cycle of the "good" ideas? A way to encourage creativity and innovation in a company is to measure it, and to make the measurements a part of the review process. Could the quantitative and qualitative measurements be used to facilitate the life cycle of bottom-up ideas, i.e., their creation, implementation and evaluation and feedback about the results in the short-term? In addition, how do the measurements support the development of the organizational development culture in the long-term?

What is the role of *rewards*? Rewards reflect organizational values as well as organizations' targets and their measurements. If the leaders understand the factors behind the development culture, the culture could be improved using suitable rewards. So, do rewards support knowledge creation, idea implementation and evaluation and, if they do, how?

In addition to the simulation game method, *what kinds of tools are needed* to improve critical organizational factors? However, because the innovation process is always a social process even more interesting to study would be more tools and methods, which make visible and improve *individual factors*, such as inter-relations between people. The challenge is to develop "safe" tools that facilitate a change, and which release anxiety at all organizational levels.

All of the case companies of this study have used the simulation game method as one development tool. Would the results of the enablers and disablers be the same in companies had the simulation game method not been used? This should be studied to clarify the *role of the simulation game in improving organizational development culture* and thereby also all bottom-up innovation processes.

Finally, what do strong positions, *hierarchical roles, and status* have in terms of innovativeness? Status itself does not give anybody the capabilities for innovativeness. Is it, however, the hierarchical role and status that give people better opportunities to affect the innovativeness than do personal characteristics? In addition, how are the enablers and disablers seen at a different hierarchical level, status, and role? That knowledge could improve the holistic understanding and management of the life cycle of bottom-up ideas.

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Appendix 1

The questionnaire in Studies I-III.

Evaluation form

We would like you to evaluate the simulation game day with this form. Please mark how well statements correspond to your opinions (I totally disagree - I completely agree) by circling the right alternative. Explain your answer further, particularly when you disagree.

Thank you for your contribution - the summary of this evaluation will be given to you for further actions !

Minna Forssén
HUT

N.N.
The Company

My role (underline): Player Observer

		I totally disagree	I somewhat disagree	I agree up to a point	I agree	I completely agree
TARGETS						
1.	I gained good overview of the simulated process	1	2	3	4	5
2.	The game increased my understanding of the activites and tasks at other sites.	1	2	3	4	5
3.	The game brought up development needs and ideas well.	1	2	3	4	5
PRACTICAL ARRANGEMENTS						
4.	I received enough briefing information.	1	2	3	4	5
5.	If not, what kind of information would you have needed ?_____					
6.	The duration of the game was ok.	1	2	3	4	5
7.	If not, how long should it be ?_____					
8.	The room was ok.	1	2	3	4	5
9.	If not, why ?_____					
10.	I was satisfied with the visualization material of the game.	1	2	3	4	5
11.	If not, how could it be improved ?_____					

	I totally disagree	I somewhat disagree	I agree up to a point	I agree	I completely agree
12. The number of players was ok.	1	2	3	4	5
13. If not, how many players should there be? _____					
14. The number of observers was ok.	1	2	3	4	5
15. If not, how many observers should there be? _____					
16. I am pleased with the running of the simulation game.	1	2	3	4	5
17. If not, how could we have improved it ? _____					
18. I had good opportunity to comment.	1	2	3	4	5
19. If not, how could the discussion have been organized ? _____					

PARTICIPATION

20. It was useful for me to participate.	1	2	3	4	5
21. The game would also be useful for other employees in the office/company.	1	2	3	4	5
22. For whom ? _____					

OPEN QUESTIONS

23. What was the most remarkable issue the simulation day addressed for you ?

_____

_____

24. How should the *simulation day* be developed - ideas for improvement?

_____

_____

Appendix 2

Long-term evaluation interviews in Study II.

pvm ____._____.1996 Yritys/pelipvm:_____

Haastateltava(t):_____

_____

HAASTATTELURUNKO

1. *PELIN JÄLKEEN*:
1.1. MITÄ KONKREETTISTA ON TAPAHTUNUT PELIN JÄLKEEN ? MIKÄ ON MUUTTUNUT PELIN JÄLKEEN? (1.avoin)
1.2. PELISSÄ ESILLE TUODUT IDEAT / KEHITTÄMISTOIMENPIDEPÄÄTÖS (vrt. pelikohtainen lista)
a) Mitä on tapahtunut idealle/päätökselle ? Idean/päätöksen “eteneminen” ja lopputulos tai nykyinen tilanne ?
b) Mitkä asiat organisaatiossa edistivät toteutumista ?
c) Mitkä asiat organiaatiossa ehkäisivät toteutumista ? toteutuksen ongelmia ?
d) Saiko onnistunut toteutus aikaan kustannussäästöjä ?
(joko itse tai haastateltava: Vastaako ne peliin käytettyjä kustannuksia - arvioi työaika !)
e) Saiko onnistunut toteutus aikaan parannuksia muilla tulosmittareilla mitattaessa (läpimenoaika, käsittelyvaiheiden lukumäärä, virheet, palvelun laatu) ?

2. *PELIN JÄLKEEN*: MITÄ MUUTA KONKREETTISTA HYÖTYÄ PELISTÄ ON OLLUT SINULLE / MUILLE ? (1.avoin)
f) määrälliset
g) laadulliset

3. *ITSE PELITILANTEEN ARVIOINTI*: MITKÄ KÄYTÄNNÖNJÄRJESTELYT (kts. arviointilomake) TUKIVAT MIELESTÄSI ENITEN JA MIKSI
h) ideointia / ideoiden esilletuloa ?
i) konkr. kehittämispäätösten tekoa ?
j) konkr. kehittämispäätöksen toteutusta ?

4. *VERTAILU MUIHIN MENETELMIIN*:
4.1. OLISIKO MUULLA MENETELMÄLLÄ **SAATU ESILLE** KO. IDEAT /PÄÄTÖKSET ?
4.2. POIKKESIKO PELILLÄ ESILLETUODUN IDEAN/KEHITTÄMISENTARPEEN **TOTEUTUS** MUULLA TAVALLE ESILLETUODUN IDEAN (ESIM. ALOITELAATIKKO) TOTEUTUKSESTA ?

5. *MITEN KEHITTÄISIT* PELIÄ TAI SEN VAIHEITA (SUUNNITTELU, PELI, SEURANTA), JOTTA SE JOHTAISI **KONKREETTISIIN** TULOKSIIN ?

Kasetti nro :

klo / kys.

Appendix 3

Long-term evaluation interviews in Study IV.

Haastattelu keskittyy siihen, kuinka henkilöstön esille tuomat työtä koskevat ongelmat ja kehittämisasiat käsitellään yrityksessäsi ja kuinka em. ideat käsitellään, kuinka niistä tehdään päätöksiä ja kuinka ne johtavat konkreettisiin parannustoimenpiteisiin. Ja jos ideat "häviävät" jonnekin ennen lopullista päätöstä tai käytäntöönvientiä, niin miksi ?

Pääteemat, joihin haastattelussa keskitytään:

1. Kehitysideoiden "elinkaari":

- Kuinka kehitysideoita kerätään ?
- Miten niitä käsitellään ?
- Miten toteutusta seurataan ?
- Kuinka henkilöstölle annetaan palautetta ideoiden käsittelystä / toteutuksesta ?
- Ongelmat edellämainituissa asioissa

2. Kerätään kultakin haastateltavalta konkreettisia esimerkkejä kehitysideoista, jotka ovat
   - edenneet toteutukseen
   - "hävinneet" johonkin…

3. Lisäksi osassa haastatteluista keskustellaan siitä, mitä tietyissä Simulaatiopeleissä esille nostetuille kehityskohteille on tapahtunut.

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Tarkemmat kysymykset:

1. TAUSTAA: Mikä on työnkuvasi ? Kauan olet työskennellyt yrityksessä ?

2. Mikä on yrityksessäsi yleinen suhtautuminen uusien ongelmien, ideoiden parannusehdotusten esittämiseen ?

3. Kannustetaanko teillä tuomaan ongelmia / kehittämisideoita esille ? Miten ?

4. Miten itse ole tuonut ongelmia / kehittämisideoita esille ?
    - annan esimerkkejä asioista ja tilanteista
    - miten ja kenelle olet välittänyt työtä koskevia ongelmia/ideoita/kehittämisehdotuksia?
    - mitä ideoillesi tapahtui ?

5. Miten ideoita yleensä kerätään ?
    - miten muilla tasoilla kerätään em. tietoa ?
        - viralliset menettelyt joka päiväisessä työssä ? jos on niin onko ne kaikille tuttuja/selviä ?
        - “viralliset kehittämisprojektit - onko niitä ollut ?
        - “epäviralliset” menettelyt ?

6. Miten ideat käsitellään ja tehdään päätöksiä ?
    - missä käsitellään ?
        - viralliset menettelyt joka päiväisessä työssä ? jos on niin onko ne kaikille tuttuja/selviä ?
        - “viralliset kehittämisprojektit - onko niitä ollut ?
        - “epäviralliset” menettelyt ?
    - kuka tekee päätökset ?
    - oletko itse ollut mukana ko. Päätöksenteossa ?
    - (johdon sitoutuminen - “näennäis osallistuminen”)

7. Onko pilotointia (testausta) ja sen arviointia ?
    - vastuuhenkilöt ?

8. Miten viedään käytäntöön ?
    - vastuuhenkilöt ?
    - aikataulut ?
    - resurssit ?

9. Miten seurataan toteutusta ?
    - kenen vastuulla yleensä ?
    - seurantamittarit ?

9A. Resurssit kehittämiseen ?

9B. “”Hiljaiset toteutukset ilman virallista päätöstä vrt. formaalit päätös-toteutusprosessit ?

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10. Mistä tiedät, missä vaiheessa ideoiden käsittely on - asioista tiedottaminen henkilöstölle?

11. Kuinka moni listassa esitetyistä ongelmista on ratkaistu / Ideoista on toteutettu ?
    - Jos ei ole toteutettu, niin miksi ei ?
    - ovatko kesken, ja jos ovat niin missä vaiheessa ?
    - Onko osa ideoista jo aiemmin tuotu esille - jos niin miksei ole toteutettu ?

12. Pelin merkitys asioiden toteuttamisessa ?

13. Enablers / Disablers ?

14. Ongelmat - yleisesti ?

15. Eri tason mittarit, josta saisi inputia kehittämisideoiksi:
    - yritystasolla
    - osastotasolla

16. Esimiesasemassa olevat: mitä teet sinulle tuleville kehitysideoille ?

Muutamilta henkilöiltä:
17. Onko Laatupalkinnon itsearviointi ?
18. Jos idea ei toteudu, mitä tehdään -> varastointi ?

Kysy vuosikertomusta ym. yleisinfoa yrityksestä !

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ESIMERKKI KOHTAISET KYSYMYKSET (alustavat) eli Mitä on tapahtunut ao. ideoille/ongelmille?

1. Kuka toi sen ensimmäiseksi esille ?
2. Onko se tullut esille ennen peliä ?
    - jos niin mitä idealle tapahtui - etenikö vai ei
    - ja jos niin mihin - kenelle?
3. Mitä idealle tapahtui pelin jälkeen ?
    - ja jos niin mihin - kenelle?
4. Tehtiinkö sen pohjalta päätöksiä ?
    - kuka teki päätökset
5. Johtiko se käytännön toimenpiteisiin ?
    - millaisiin ?
    - hyödyttikö ne sinua ?

6. Miten ideaa koskevista päätoksistä informoitiin sinua / henkilöstöä ?
7. Miten idean käsittelystä yleisesti ottaen informoitiin sinua / henkilöstöä ?

8. Minkä takia toiset ideat toteutetaan ja toiset eivät ?
9. Mitkä tekijät/asiat edistävät/helpottavat ideoiden ja uuden tiedon etenemistä ja käytäntöönvientiä ?

10. Millaisia ongelmia sinun mielestäsi on ongelmien käsittelyssä ja uusien ideoiden toteutuksessa ?
    - miksi joitain ideoista ei toteutettu ?
11. Mitkä tekijät/asiat ehkäisevät /estävät ideoiden ja uuden tiedon etenemistä ja käytäntöönvientiä?

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