Information Systems Strategy Formation Embedded into a Continuous Organizational Learning Process

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Mintzberg's viewpoint that strategy is an emergent learning process rather than a plan has a valuable contribution to make to the Information Systems (IS) field. This argumentation has rendered both the necessity of strategy planning sessions and the strategy plan itself questionable. Here, strategy is seen from an experiential learning perspective, but learning is supported by planning sessions. The purpose of the planning process is to produce a formal plan to direct IS development and utilization. On the other hand strategy is what an organization knows, not what is written. The outcome of an IS strategy process should thus be an increased understanding of IS opportunities and constraints, and a shared view of IS utilization. This study presents an approach to combine the learning and planning approaches to strategy formation. An approach to link the experiential learning cycle and the Information Systems Strategy (ISS) process is presented and tested. The proposed solution is based on four process phases. First, evaluation of the current organizational reality of IS utilization from the management, usage and Information Technology (IT) viewpoints. Secondly, joint learning through an interactive planning process between interest groups to improve managerial abilities, change organizational structures and reach a common view of IS use and management (i.e. IS Strategy). Thirdly, another learning process directed by IS strategy during implementation at middle management and personnel levels. Finally, the outcome of the ISS process has to be constantly observed and evaluated to understand progress and needs for further development. A longitudinal case study has been conducted to test the developed approach. The research process is presented and the outcomes of the approach discussed.

Serious ISS implementation problems have been reported despite insightful planning sessions, and far too often the ISS is just a plan that has not been implemented (Earl, 1993; Lederer & Sethi, 1992). Furthermore, the strategy concept is evolving. The Mintzberg (1994a; 1994b) - Ansoff (1994) debate is an example of two extremes. Ansoff's (1965) older work emphasizes the formal planning session in strategy formation whereas Mintzberg argues that strategy is an emergent process that cannot be planned. Mintzberg emphasizes learning in strategy formation instead.

Here, strategy is seen from the learning perspective, but learning is supported by planning sessions. It is our opinion that a strategy formation should include two parallel processes - namely planning and learning. Further, both should be viewed from the constant information management perspective. The purpose of the planning process is to produce a formal plan to direct IS development and utilization. On the other hand strategy is what an organization knows, not what is written. The outcome of an IS strategy process should thus be an increased understanding of IS opportunities and constraints and a shared view of IS utilization. In this context our knowledge from several case studies indicates the necessity for a learning perspective in ISS processes (Reponen, 1993; Reponen, 1994; Ruohonen, 1990; Salmela, 1991).

An ISS process is extremely context dependent and we should also consider ISS from the organizational perspective

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(Sullivan, 1985; Vitale et al., 1986); this approach has been found to be most effective in the success of IS strategy (Earl, 1993). The organizational approach demands a balancing of both the constraints and opportunities set not only by the business environment and Information Technology (see McFarlan, 1984; Porter, 1980; Porter, 1985) but also set by the organization (Porter, 1991; Prahalad & Hamel, 1990). The organizational context could set enormous barriers to develop IS management and use practices (Argyris, 1990; Attewell, 1992; Cohen & Levithal, 1990; Galliers, 1991a; Kim, 1993) and these barriers have to be recognized before learning efforts can be directed. Further, "invisible resources" (e.g. skills, knowledge and motivation of organizational actors) are seen to be more important in this context than the "visible resources" (e.g., data, hardware and the software in use) they also create and maintain. This leads us to the evaluation of organizational resources and their coordination to support learning process. The abilities to use and manage IS are not alone sufficient. In relation to such abilities we have to understand how they are integrated, communicated and utilized (Nordhaug & Grönhaug, 1994; Weick, 1993).

The objective of this study can be expressed in the following research question: How can the Information Systems Strategy process be embedded into a continuous experiential learning process? To answer this question, an approach is presented to link the experiential learning cycle and ISS process. The adopted learning perspective emphasizes the internal issues i.e. organizational abilities to use and manage IS.

This paper is organized as follows: the concept of an ISS as a part of the continuous learning process is outlined. Secondly, a case study based on the learning concept is described. Finally, the research findings are discussed.

IS Strategy From the Experiential Learning Perspective

In organizational settings, strategy and learning have a dualistic role to play in IS management and use. First of all, strategy formulation is a learning process where management itself is a learning unit. It therefore needs multiple views from different stakeholders (i.e. individual level mental models) and their interaction to achieve common goals (i.e., shared mental models at organizational level) (Kim, 1993). Here it is argued that the strategy process can be used to build shared mental models and to improve managerial abilities. The formation of strategy requires double-loop learning (Argyris & Schön, 1978) at managerial level. In organizational settings, practices exist which raise barriers against learning. Argyris (1990) called these barriers organizational defensive patterns. Overcoming organizational defensive patterns is more the duty of management than personnel because it requires the ability and power to change organizational structures or organizational norms.

Secondly, strategy is seen as being important for the direction of learning in organizational settings (Dodgson, 1993). It is management's responsibility to direct and support individual and organizational learning; strategy can be communicated to the organization to give this direction. After all, the success of strategy depends on its implementation i.e., strategy communication and execution. In this context strategy implementation is seen as a learning process at middle manager and personnel levels. At the users level, the process of adopting IS requires learning to understand the potential of an innovation in the work situation and taking action to assimilate an innovation. The nature of learning such as this is mainly single-loop, an error-detection-and-correction process which permits the organization to continue with its present policies and achieve its current objectives (Argyris & Schön, 1978). On the other hand, users have to continually seek opportunities to improve their work and should suggest new tools to be implemented. The recognition of possibilities requires organizational and IS knowledge and abilities to combine them. Users should at least make suggestions about whether an innovation should be adopted or not. This process requires a higher level of learning (i.e., double-loop) as the employee has to understand how to alter current practices.

Here, it is seen that a continuous learning process can be supported by the formation of an ISS, based on the idea that a need exists in many circumstances to put together a project for a more thorough analysis of the situation (Reponen, 1994). Such an approach could be based on Kolb's (1984) scientific inquiry process^– (see Figure 1, inner circle). The outer circle presents the phenomenon of IS strategy formation embedded into the continuous learning process. It consists of the following process phases: 1) analyzing; 2) planning; 3) implementing and organizing; and finally 4) constant management of IT. Next, we go on to describe the process phases and their nature. Further, we suggest practical methods developed to support the process.

Signals for ISS Formation Process

The need for change (i.e. a signal) and establishment of an ISS formation process may originate from changes in the business environment, Information Technology possibilities or organizational issues. The business environment signal may originate from changes in competitive forces (see Porter, 1985) or state regulations. Radical changes in IT possibilities may offer new potential or threats for the company and thoughtful analysis may be needed to understand their importance to business activities and the role IS should play. The organizational issues may evolve from e.g. insufficient overall internal efficiency, a limited understanding of the potential of information technology within the organization or a low level of ability to integrate IS into work processes. Further, the need for an ISS formation process may evolve from changes in organizational structures. For example, changes in centraliza-

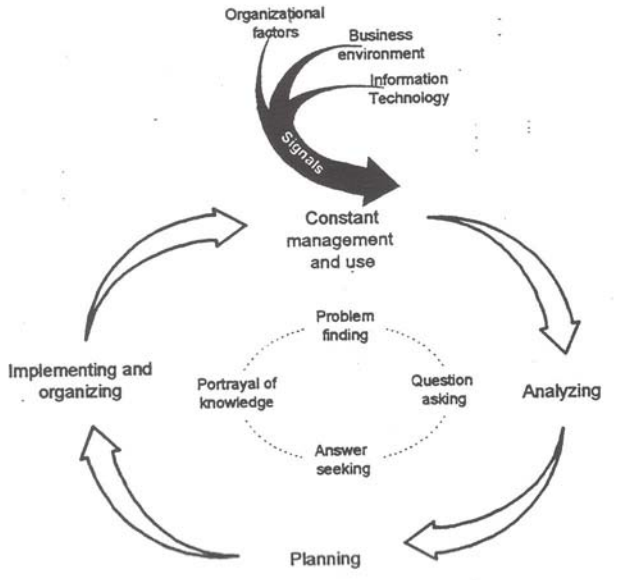

Figure 1: ISS and experiential learning process (inner cycle adapted from Kolb, 1984)

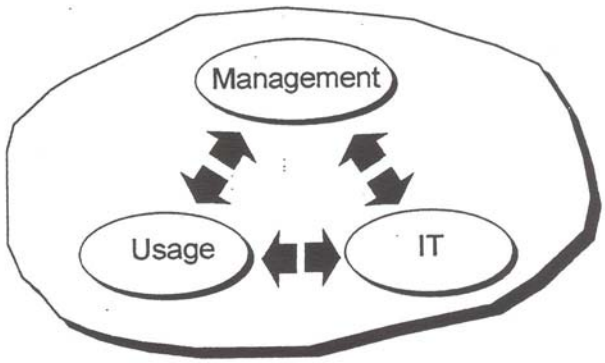

Figure 2: Organizational maturity in the context of IS management and use

tion - decentralization may put an organization in a situation where organizational actors have to learn new skills and knowledge. It is further typical that an organization may not have any communicated ISS and a strategy process is thus implemented.

The signals may have different time perspectives, too (Senge & Fulmer, 1993). They may originate from realized changes (reactive perspective) or from business visions (proactive perspective). In reactive situations, organizational actors (usually management) are forced to establish radical change processes. In a proactive situation, current IS strategy and organizational capabilities to support business goals with IS might still be sound, but forthcoming change may imply the need for change. A proactive perspective allows an organization to avoid shock.

Analyzing

In order to analyze the organizational stance we use a conceptual framework known as IS-related organizational maturity (Auer, 1995). The model presented in Figure 1 underlines the need for understanding the existing organizational abilities before directing learning efforts. It is the achieved competence which makes it possible to acquire new abilities (see also Cohen & Levithal, 1990; Huff et al., 1988). The definition presented by Davis (1987) can be used as a starting point for our organizational maturity definition. Davis defined that "organizational maturity in use of a computer-based information system reflects the fact that organizations exhibit a learning process." He continued that "it is not feasible to implement a complex information system in an organization until participants have 'learned' on a less complex system." Whereas Davis concentrates on users' IS abilities and usage our intention is to consider maturity from management and IT perspectives as well.

Here, the term information systems related organizational maturity refers to a balance between the information technology being deployed, and the abilities and views to master and use information technology in an organizational context. This maturity definition is related to usage, management and Information Technology components, and their interaction in a specific environment (see Figure 2).

The usage component implies user organizations' abilities to utilize information systems in their work. The advanced state of the usage component can be diagnosed by analyzing skills and knowledge to use IS, IS views, and actual IS use in organizational context. For that purpose a taxonomy including five factors is presented. The list is based on the one presented by Zmud (1983) and Nelson (1991), but categories have been combined (IS-product and technical skills as IS skills, organizational skills and knowledge related to organizational overview, and target organizational unit as organizational skills and knowledge) and two classes to assess IS views and usage have been added.

- IS *usage* - including frequency and amount of use, division of usage (i.e., delegation and heterogeneity), and types of IS in use.
- IS *skills* - including operational skills to use, develop and maintain IS (from the end-user perspective), and support work tasks with IS.
- IS *knowledge* - including knowledge about hardware and software concepts, IS potential, organizational IS policies and plans, and existing IS applications.

- IS *views* - including willingness to utilize IS, develop IS skills and knowledge, IS responsibilities, and views about the role of IS.
- *Organizational skills and knowledge* - including skills or knowledge about interpersonal behaviour, group dynamics and project management, objectives, purpose, opportunities, constraints, internal and external functioning and organizational links

The management component must mediate between technology and users to supply the general direction in which to develop IS activities (Galliers, 1991a; Reponen, 1993; Reponen, 1994). But this interaction is twofold. Management has to be aware of the technological possibilities, and at what rate organizations can achieve changes in the way they work. The management component can be evaluated by analyzing abilities to recognize the value of IS, to identify the role IS should have, to make organizational IS decisions and to coordinate IS assimilation processes.

For that purpose a list including three factors is presented. The list is close to the one used to evaluate the usage component, but classes to assess IS skills and usage have been excluded. Further, the issues included in the categories have been modified. For example, the IS knowledge also includes an understanding of the usage component and IS views concentrate on the willingness to direct IS issues instead of a willingness to use IS. The issues to be analyzed are as follows:

- *IS knowledge* - including knowledge about hardware and software concepts, IS potential, organizational IS policies and plans, existing IS applications, and understanding of the usage component.
- *IS views* - including willingness to direct IS utilization, IS responsibilities, and views about the role of IS.
- *Organizational skills and knowledge* - including skills or knowledge about interpersonal behavior, group dynamics and project management, objectives, purpose, opportunities, constraints, internal and external functioning and organizational links.

The IT component (i.e. hardware and software) is a platform for IS development and use. It is the "traditional" view of organizational computing that describes what kind of technology is in use and to what extent. Attributes of IS from innovation perspective can be used as guidelines to evaluate the IT component (Kwon & Zmud, 1987; Rogers, 1983). These attributes can be used from two perspectives: First, they are adopted to explain possible reasons why an IS has (or has not) been adopted or why the adoption process is lacking. Secondly, we can identify assimilation barriers and by doing that we can overcome them.

- Compatibility is the degree to which an innovation is perceived as consistent with the existing values, past experience and needs of potential adopters. A more compatible innovation is also adapted faster.
- Relative advantage (economic or status) is the degree to which an innovation is perceived as better than the idea it supersedes. Relative advantage is positively related to the rate of adoption.
- Complexity is the degree to which an innovation is perceived as relatively difficult to understand and use. The complexity is negatively related to an innovation's rate of adoption.

Maturity and its components are understood in their context (Kling, 1987). The internal environment includes, for example, organizational settings such as organizational structures, work processes, tasks and the division of labor. The internal environment is further crucial to the analysis, since organizational structures and norms direct learning and by doing so might establish learning barriers (Kim, 1993). The external environment includes competitive forces (Porter, 1980; Porter, 1985) and state regulations. Porter's five competitive forces model can be used to analyze the external environment. It is still a very workable framework with which to describe the opportunities and threats that competitive forces may offer. The model summarizes the most important factors; it has nevertheless been said to concentrate on industrial level analyses and exclude macro level forces (Grant, 1991). But it is our view that Porter's model implicitly summarizes these factors, since the macro environment effects the company indirectly through the structure of the industry.

Planning

The challenge of the planning phase is to support both single- and double-loop learning. In many cases, general management responsible for strategic decisions has insufficient knowledge about general IS issues, or firm specific IS practises and IS resources. Thus, learning about these issues should play a central role, but such learning is not enough as it strengthens mainly existing organizational structures (single-loop). In a strategy process, we should be able to trigger second-loop learning. This is seen here to be more challenging, as participants should be able to produce solutions to change existing organizational practises and values. The concept of the Evolution Model for Information Management Strategies (EMIS) developed by Reponen (1993; 1994) is seen here as a solution to facilitate both single- and double-loop learning.

The EMIS model - which represents the organizational approach - regards IS strategy as a result of an interactive working process to support learning in the organization. The contents of the strategy may be different in each case, but based on our research findings the elements in IS/IT strategy formulation are (Reponen, 1994):

(a) External opportunities for using IT as a competitive weapon.

(b) Internal opportunities for supporting competitiveness by means of IT.
(c) Other application areas of IT.
(d) Organizing the information management function.
(e) A rough architecture for information technology.
(f) An estimation of the IT capacity needs and investments.
(g) An estimation of the benefits of strategy realization.

These are the main decisions that business managers have to make in the field of information systems. Consequently these are the main areas where management involvement is needed. One of the main questions of information management planning is what should be integrated or aligned. Our opinion is that a good strategy should be based on the following factors, which should then be integrated by the strategy (Reponen, 1994):

- Management vision and business strategies.
- Development in IT and the state of the organization's information processing.
- Theoretical knowledge of information management and concepts based upon it.
- Practical experiences in applying IT and examples of successes and failures in that area.

Mutual understanding and commitment between managerial groups is one of the driving frameworks behind the EMIS model. Different managerial groups should participate in planning, thus making it possible to increase mutual understanding of the use of the information resource (Couger, 1988; Johnston & Carrico, 1988; Lederer & Mendelow, 1988; Reponen, 1993). The most decisive (Ruohonen, 1991) managerial groups in ISS processes are Top Management, User Management and IT/IS Management.

The creation of IS strategy clearly requires multiple methods. Earl speaks of team-work as a method in the organizational way of creating information systems plans. We have tested a combination of multiple methods (Reponen, 1994): lectures, team work, meetings, interviews, expert reporting and the drawing up of plans. Each method should increase the interaction between participants and act as a tool to support the development of each participant's personal skills and understanding of information management.

By using a combination of these methods it is possible to yield the highest possible contribution from all the participants; each participant will be able to make his contribution in the most convenient way. Large, cumbersome planning processes may be partly avoided by good coordination and the flexible use of multiple methods.

Implementing and Organizing

The implementation of IS strategy is seen here from a wide perspective. Strategy implementation requires organizational learning at managerial and employee levels. In strategy formulation management acquires information and learns by making the plan, but the goal will not be actively realized until implementation. Non-managerial personnel is an outsider as far as strategy formulation is concerned, but the actual success of the planning process can be seen in their daily work. The issues in the plan should be integrated into both management and business processes - the ways to manage and to perform work processes. Thus, we have to put effort into the communication of the plan. Furthermore, barriers exist in an organizational context against learning and implementation. They might be structural, human (due to management or employees), or technical (Argyris, 1990; Beatty & Gordon, 1988; Dodgson, 1993; Huff et al., 1988; Kim, 1993). In our view implementation should include the following issues:

- Communication of the plan,
- Removal of the learning barriers and
- Execution of the plan.

Although the planning and implementation phases are presented separately, implementation through communication actually begins in the planning phase. The number of participants in that phase has to be limited. The principles behind the IS strategy should thus be communicated to middle management and specialists. Our experience shows learning sessions and workshops to be suitable for that purpose.

An organization could have learning barriers in all three maturity components. The development process selected to remove learning barriers is dependent on which component has been identified as lacking and in need of development, for example to make it possible to change work arrangements. The alternative development routes are user (e.g., user skills and knowledge intensive), managerial (e.g., managerial skills and knowledge intensive) or IT (e.g., investments in hardware and software projects) specific.

In the execution of the plan the links between business and information systems are even more important than in the planning phase (Reponen, 1993). As the implementation process is long, it is necessary to follow up and rethink the role of IS and IT in a company's operations continually. At an individual IS project level the organizational environment should be scanned to guide the implementation of the strategy plan and realize possible changes (Salmela, 1993).

Constant Management of IT

The analyzing, planning and implementation phases are followed by the constant management of IT. Constant management of IT is an integral part of the learning process. In this phase, learning is based on reflective observation (Kolb, 1984), where management evaluates how IS are utilized to support organizational goals. The outcome of a learning - as well as an ISS formation - process should be a relatively permanent change in behavior (Nelson, 1991). This underlines the importance of evaluation. Although a strategy pro-

cess improves conceptual abilities, it might not be able to change patterns of behavior. Thus, in the evaluation, we have to draw a distinction between applied abilities and abilities that may be conceptually understood but not in use.

Evaluation through observation is a daily process, but after a while a deeper insight into the outcomes of the strategy implementation has to be achieved. The most important parts of the strategy should be evaluated in line with the possible changes in the business environment and organizational practices, because strategy should be a living entity. Pure analyses of the degree of strategy implementation may ignore the demands of the changed business goals. The main purpose of IS strategy is to direct IS utilization to improve an organization's profitability. Thus, the benefits of the IS strategy should be critically evaluated to unearth possible distortions in IS utilization. The evaluation may lead to another ISS process, to an ISS update project or to confirmation of the existing strategy together with development programs to improve maturity components.

Summary

Learning by doing does not bring new information, since it strengthens the existing processes. Senge (1990) stated that there is a learning dilemma; "we learn best from experience, but we never directly experience the consequences of many of our most important decisions". Our intention is to make a learning process more structured and to give a long-term perspective to IS management. The starting point for our approach is based on the idea that learning is at its best when learners go through all the phases presented earlier (Kolb, 1984). They can then develop conceptual frameworks through external observation and abstract conceptualization, which can be transferred into practise through active experimentation and reflective observation (Kim, 1993).

The approach presented gives us a framework to connect ISS into a continuous learning process, but according to our understanding, IS management and use have to be understood in their context. This idea holds equally true when the approach is deployed in an organizational context. Therefore, the method has to be adjusted to be suitable for each case. In the following case study we go on to describe how the approach has been used in real-world settings.

Case Study

The presented approach to embed ISS into a continuous learning process is "dynamic" in nature. As the dynamics of the concept and our aim to test the approach in real-world settings imply, we needed a long-term perspective. Further, we adopted an action research approach as it offered an opportunity to understand the phenomenon in its context. The approach made it possible to combine the researchers' theoretical knowledge with practical knowledge of the object organization (Argyris et al., 1985; Galliers, 1991b) and to

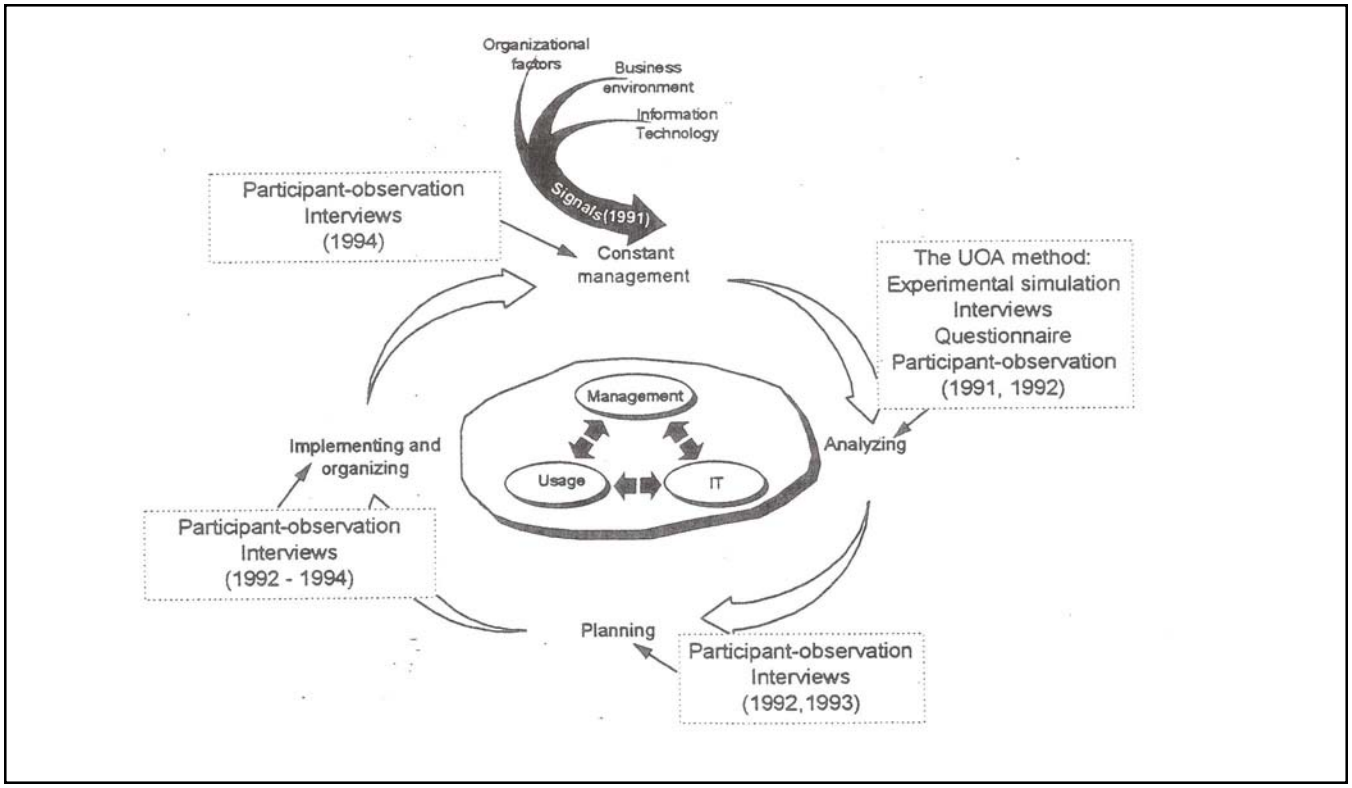

Figure 3: Research methods in process phases

recognize and understand long-term changes in IS practises.

The research objective is a conglomerate operating in the foodstuffs, animal feed and chemical fields. In 1993 the company employed on average 2100 people and the total turnover was US$ 614 m. The largest division was represented by foodstuffs and its proportion of total turnover stood at 53 % while that of animal feed was 23 % and chemicals 24 %. The company has been both very successful and profitable. In this study we concentrated on the foodstuffs division.

The research process was based on the experiential learning process presented in the previous section (see Figure 3). To be able to recognize the outcome of the ISS formation process, the research process took, altogether, three years.

The signal for the need to improve the quality of IS use and management was identified in 1991. The first step, following the signal, (1991, 1992) was to assess the object organization's IS-related organizational maturity. The evaluation was performed using a method known as User Organization Abilities Analysis (UOA) (Auer, 1995). The UOA method employs pluralism; multiple methods enabled us to bind quantitative (experimental simulation, questionnaire) and qualitative data (interviews, participant observation) together and offered the opportunity for triangulation (e.g. Benbasat et al., 1987; Fitzgerald, 1991; Galliers, 1991b). A questionnaire was used to gather information about organizational factors and information systems, while experimental simulation was used to assess users' skills with existing systems. It was thus possible to diagnose the potential of existing information systems.

The diagnosed state of IS-related organizational maturity provided guidelines for the planning of IS strategy (1992, 1993). In this phase we used the concept of the Evolution Model for Information Management Strategies (EMIS) described earlier. Data collection was based on semi-structured interviews and participant observation.

Implementation and organization (1992 - 1994) occurred over a long period. This phase began before the planning process was completed and some development projects were still going on at the time of the evaluation in Autumn, 1994. The data collection methods included semi-structured interviews and participant observation.

The final step - constant management of IS - was an evaluation of the progress in the object organization (1994). The evaluation was mainly based on the interviews, but information gained through participant-observation in the earlier process phases was also available.

In the following analysis the focus is on the process itself. The analyses are intended to provide us with an understanding of the most important issues in each process phase. Due to a lack of space, the analyses do not go into great detail (detailed information is available in Auer, 1995).

Signals for ISS Formation Process

The originators and perspective of the signals which implied a need for an ISS strategy project varied between organizational levels.

At conglomerate level the main source was the challenge (1991) to form an organizational structure to maintain and improve competitiveness in order to meet the challenges offered by forthcoming European Union (EU) membership^. The company saw that the EU would radically change the competitive environment. The number of competitors would increase and that of domestic suppliers decrease. The prices were expected to decrease radically due to the changes, which would demand more effective internal processes. At the same time, the divisions were expected to increase exports. Thus, at the conglomerate level, the nature of the signal was proactive and it originated from the forthcoming changes in the business environment.

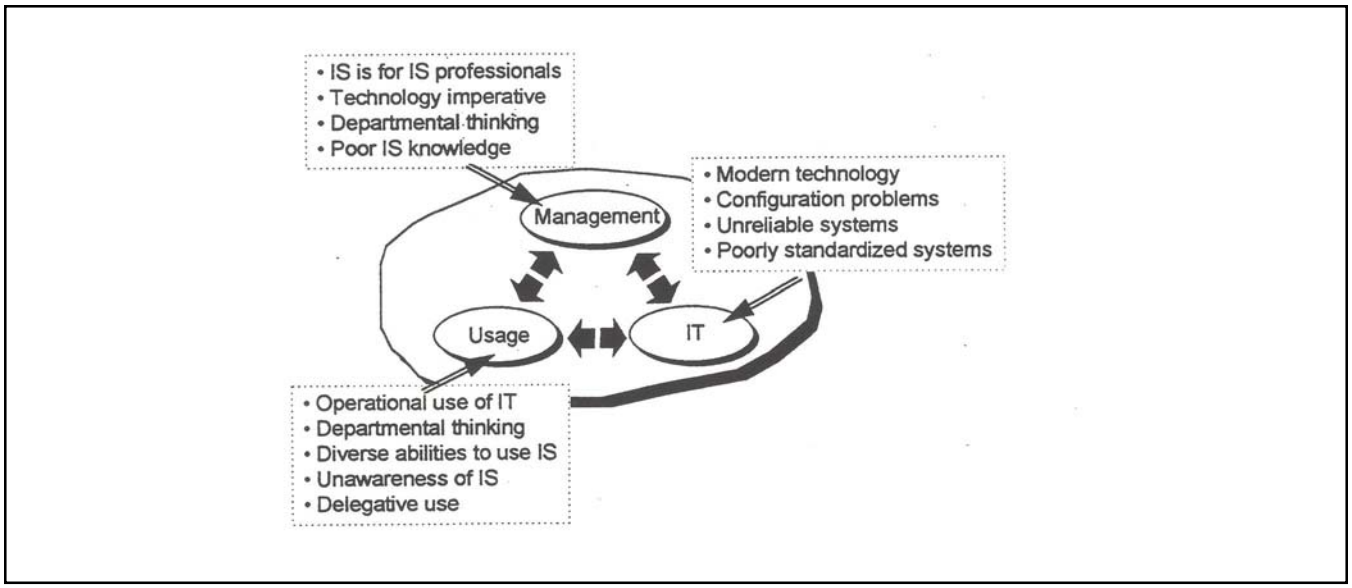

Figure 4: Evaluation of the maturity components

The CEO viewed current IS management practises as unsuitable for meeting future demands and started an IS reorganization project. According to the plan the conglomerate would be responsible for the general IS platform and the divisions for their IS utilization (management, development and use included). IS strategy at conglomerate level was not formally written up, but was nevertheless clear. The guidance of the CEO put the foodstuffs division in a new situation, for which it had to manage and develop its own IS systems. Thus, it was the decentralization decision (i.e. organizational factor) that gave the signal for an ISS formation process in the foodstuffs division. Similarly, the perspective of the signal was reactive rather than proactive.

Analyzing

The analyses are based on the IS-related organizational maturity concept. Here, we are interested in to identifying the most important issues that had an impact on the quality of IS use and management in the object organization. To that end, the three maturity components - IT, usage and management - and their interaction are summarized (see Figure 4). We do not describe the attributes of the components, although they formed the basic unit in the analyses.

The evaluation of the IT component implied that the conglomerate operated with quality microcomputers, good mainframe systems and modern local area networks, but the quality of the installations was poor in many cases. In particular, the operational systems were functional, but even they suffered from redundant information and some important systems were unreliable. The microcomputers suffered from non-standard solutions even within work groups. This made it impossible to share information.

The overall picture of the usage component was satisfactory although a big gap existed in terms of the need. IS were used to support operational task effectively, but only very marginally to support coordination or planning. Operational systems supported process thinking and allowed interdepartmental co-operation, but these features were not properly used. For example, production did not enter data into the systems punctually which caused problems in other functions. Furthermore, unnecessary manual work was being done, since the user organizations were not aware of the available systems. The adoption of more complex software applications and packages had failed time after time. A new software application offering sophisticated user definable query and reporting functions was implemented, but only a few people in the whole company were able to cope with these activities yet. The maturity level caused problems in the division of labor, too. More skilled staff were doing their peers' secondary tasks, so their primary work suffered.

The maturity level of the management component seemed to be the most underdeveloped. Management was unable to direct IS utilization and had insufficient knowledge to prioritize IS investments. This phenomenon was a cause of the general managers view that IS issues were the responsibility of IS professionals alone. General management believed that IS problems could be solved simply by investing in information technology. They failed to recognize the problems organizational actors' actions and abilities could cause. The structure of IS and the development programs implied that management suffered from departmental thinking. IS projects concentrated on suboptimization and they overlooked interdepartmental co-operation.

The IS-related organizational maturity concept suggests that all three components have to be in balance. In the foodstuffs division, the business units, organizational functions within them and the maturity components themselves did not interact properly. The problems initially revealed the need for second-loop learning. The originator of these problems had been the management, since it is their duty to create and change the organizational structures. Further, the business units in the foodstuffs division had been relatively independent, but the decision to decentralize IS issues to business divisions underlined the need for co-operation. In the object organization, practitioners found the results some what surprising. Before the evaluation was done, the object organization thought the biggest problems lay in their IS, but this was not the case - users lacked the abilities to utilize the systems and management to direct IS utilization. These research findings provided the impetus for the planning phase.

Planning

According to the decentralization plan the business divisions were responsible for their own IS development and utilization, so the object organization had three separate ISS project - all of which produced a written ISS. Each project had been organized differently and the management's participation also differed. We participated as facilitators in one of them - building the foodstuffs division ISS.

To begin with the foodstuffs division did not participate in the IS arrangements because they felt the structure of the division needed major changes. For example, in 1992 they bought one company into the conglomerate and merged two business units together, and in 1993 they sold one business unit. Even after the restructuring the business unit were relatively independent and the division was more diverse than the other two. Not until in the end of 1992 did they feel it was time to concentrate on IS issues. The management - both the conglomerate's and the division's - decided to establish an IS strategy process.

They invited us to help them with their IS strategy formation. A marketing director was selected from the company as project champion together with representative from each SBU. Our role as researchers was to act as facilitators (Reponen, 1993; Reponen, 1994; Salmela, 1990). The CEO and the heads of the SBUs formed a supervisory group; the group was most active in its participation in the phases where guidance and decisions were needed.

The commission stated that we should find possible solutions to integrate the foodstuffs division's IS activities, based on the conglomerate's IT architecture. According to the analyses, the biggest challenges were to improve managerial IS abilities and build a shared IS vision. Double-loop learning was required because new solutions were being sought to organize and direct IS activities in the foodstuffs division.

In order to facilitate learning and build a coherent view among the most important managerial groups, we employed the EMIS model. In the process, special effort was put into the interviews. We interviewed persons representing different organizational positions and functions. The purpose of the interviews was threefold: first, to collect information. Secondly, the interviews were important for spreading knowledge and improving understanding about IS and its possibilities for supporting organizational goals. Thirdly, we wished to motivate the interviewees to support ISS implementation in its later phases. The interviews were followed by informal discussions, workshops, seminars and reports written by participants, planned to support interaction and learning.

Based on the interaction, a written ISS plan was completed that included the role IS should play, the organization of IS activities and an investment plan to integrate the independent business units' IS (see the issues in the EMIS model).

Implementing and Organizing

As stated earlier, ISS implementation should already be started when planning the strategy, because formation cannot be totally separated from its implementation. Implementation therefore includes three aspects: the removal of learning barriers, communication of the ISS and execution of the plan. Further, the implementation can be understood as another learning cycle at employee and middle manager levels. The actions taken based on our suggestions for improvements are presented in the Figure 5.

It was our view that development routes to remove learning barriers should have been implemented although no ISS processes were enacted, because the problems in the maturity components were such that they prevented productive IS utilization. But, we were able to adopt a proactive course of action with regard to ISS formation done in all the divisions. They directed the future requirements of technology, management and users.

The first thing to do was to decide on IS update projects, because the quality of IS inhibited effective work. IS abilities were low at both using and management levels, so it was first determined what the user organizations were required to be able to do with IT, and then action was taken to set up development projects. The projects included training, but the most important thing was to put the IS to work by giving it a clear goal. Further, there were a lot of software applications of which business units knew nothing. The user organization therefore had to map existing systems. In addition to the development of the maturity components, some structural changes to the work processes were made to support interdepartmental processes.

The communication of the strategy is crucial in the earlier phases in order to guarantee proper understanding of the strategy. The purpose of the communication is to direct single-loop learning, but higher level learning is also needed.

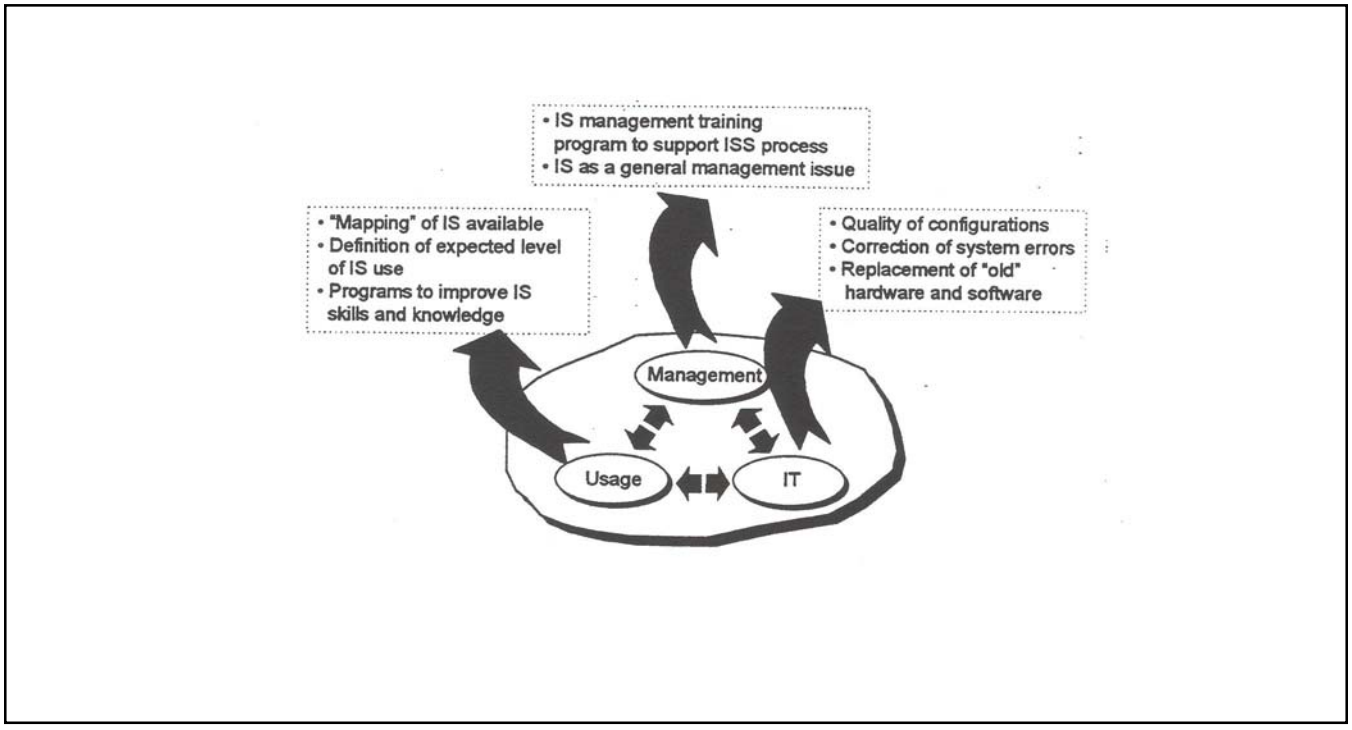

Figure 5: Actions taken to support ISS implementation

We supported strategy communication with seminars and workshops. The participants in these sessions came from all divisions and SBUs and there make up was up to some extent to those that actively undertook planning. This approach made it possible to spread background information to organizational actors. Strategy gives the direction for IS activities but cannot be formulated to include very detailed information. A good approach was thus to set tasks to middle managers and specialists to adjust the plan to their working environment and find solutions to practical problems according to the strategy. Through making the adjustment they learned the strategy and were able to act to execute the plan. This also gave feedback to the planners and made the strategy more implementable.

The execution of IS strategy included IS development projects (i.e. infrastructure, software, and organizational change programs) and IS management issues (management practices, IS organization). In all three divisions strategy execution consisted of mainly IS development projects. But according to the strategy, IS decisions should be part of normal management practice. Strategy formation as a separate project might create an atmosphere where management would not feel responsible for IS activities on a continual basis. Thus, one issue in strategy execution was to establish IS management practices in the business divisions. We supported this through managerial training and specifying the issues management should be responsible for and this was also taken into account in the formation of an IS organization.

Constant Management of IT

The final empirical process phase was a qualitative evaluation of organizational maturity. The overall picture of progress was positive: it seemed that remarkable improvements had been achieved by concentrating on IS issues. The greatest changes took place in the management component, and in 1994 general management was able to direct IS activities. More importantly, the maturity components were in balance in their environment and offered a good basis for quality IS utilization. At the beginning, the IT component was the strongest of the maturity components. This is perhaps the classical case, where IS professionals are guiding IS activities - they put most emphasis on the issues they are most familiar with.

In general, IS use had became more widespread and the motivation to use IS had increased. This development in the usage component seemed to be due to the increased attention paid IS utilization and training; management had indicated a direction for IS use. Users were more active and they had a better idea of the possibilities that both mainframe and microcomputer systems hold. The biggest changes in the management component were in terms of attitudes. In 1991, business unit management regarded IS as a matter for IS professionals. By 1994, they felt it to be one of the most important means by which to develop business activities. They saw IS as a part of business and actually directed IS activities. Furthermore, management's understanding of IS had been increased. In 1991 they regarded IS development and management as a purely technological matter, but by 1994 they seemed to understand the human side of IS as well. The IT component had also improved. The basic IT structure itself (networks, computers etc.) had not changed to any noteworthy degree, but the quality of installed components was better in 1994. Better use was being made of the platform potential through new applications. Systems went down less frequently and were more suitable for the work for which they were intended.

Altogether, the improved balance between the components had made it possible to improve the overall quality of IS utilization. Management, for example, had recognized that the usage component is slow to change, and it is likely that efforts to improve the usage component will continue.

Conclusions

A major concern in IS strategy literature has been that IS strategies are just plans which have not been implemented. Researchers have stated that the nature of Information Systems Strategy is emergent, and cannot be planned. According

	1991	1994
Usage	• Operational use of IT	• IS used to coordinate and plan operations
	• Departmental thinking	• Inter-departmental understanding of work processes
	• Diverse abilities to use IS	• Groups more homogenous
	• Unawareness of IS	• Systems with potential in use
	• Delegative use	• A tendency towards direct use
Management	• IS is for IS professionals	• IS part of general management¨
	• Technology imperative	• Business led IS¨
	• Departmental thinking	• Interdepartmental managerial co-operation
	• Poor IS knowledge	• IS possibilities well known, but not yet communicated
IT	• Modern technology	• Modern technology
	• Configuration problems	• Less configuration problems
	• Unreliable systems	• Functional systems
	• Poorly standardized system	• Standardized IS solutions in SBUs¨¨¨¨¨

Table 1: Changes in maturity components

to our research findings, the emergent perspective seems to dramatize the unpredictable consequences of IS. Perhaps IS research has not been able to map organizational readiness to utilize IS. Here, it is seen that IS has both unpredictable and predictable consequences, but their apportionment is dependent on the attributes of the technology itself, managerial abilities to recognize the value IS has and on organizational capabilities to utilize IS. In addition, the process itself has to be able to recognize unpredictable consequences and take action to control them.

In order to improve implementability, an Information Systems Strategy process should, in our view, include both the learning and planning aspects. Our goal has been to combine these as parallel processes, where the outcome of organizational learning produces a plan for Information Systems Strategy. The planning process should be seen as a "tool" to support learning. In this context, we regard the written plan to be of secondary importance. Its main purpose is to formalize the ISS process and give the process a target. The approach presented to embed an ISS formation process into a continuous learning process offered a structured view and long-term perspective to IS management. It was possible to limit the unpredictable consequences of IT investments by combining the process phases of an ISS formation into one long-term learning cycle.

First of all, we paid attention to the signal that implied the need for change. The nature of the signal also affected the whole ISS formation process. Here, the signals implied the need to change both organizational practices and the way IS should be used to support organizational goals.

Secondly, we explicitly connected existing IS-related organizational maturity to the planning phase. In the case study, the assessment - analyzing phase captured a realistic overview of IS activities, and identified the potential for improved effectiveness both in general and within different organizational units. Based on the results, we were able to establish a learning-intensive planning process to facilitate managerial learning and interaction between the managerial groups.

Thirdly, we connected both the analyzing and the planning phases into the implementation of ISS by directing development efforts towards the issues identified as lacking and in need of improvement. We did not separate ISS from organizational reality, since practises existed that prevented both the assimilation and quality utilization of IS. These practises were withdrawn before learning efforts were directed. Further, a central part of the implementation was the communication of the strategy. Here, we supported the communication by adjusting the ISS to the working environment. The adjustment also served as the basis for the execution of the strategy, since organizational actors had already evaluated the strategy from the implementation perspective.

Finally, we focused our efforts on the evaluation of the strategy. The evaluation's main purpose was to improve management's ability to understand the consequences of their actions through reflective observation. Management thus became more aware of the IS issues.

The approach developed to embed IS strategy into a continuous learning process is offered as the contribution of this study. The research resulted in new information about the organizational use and management of IS. The continuous learning perspective was found to be applicable and useful in the longitudinal research project. The approach made it possible to attain a deep insight into the object organization's IS-related organizational maturity, and by so doing to target learning and planning efforts towards quality IS use and management. The construction of the research model presented has been achieved in a controlled fashion based on literature and knowledge derived from our prior research projects.

It is our view, however, that a research instrument can only be validated through a long process based on multiple methods and multiple studies. Therefore, the forthcoming studies should put special attention on the validation of the conceptual framework and research instrument employed. We suggest that approach to embed IS strategy into a continuous learning process should be tested and developed, on several occasions, in order to make further generalizations. Another possibility is to concentrate on barriers against quality IS use and management, since the analysis revealed that learning barriers seemed to be an important factor for stagnant IS utilization. To that end, for example, a survey instrument to identify the most important organizational learning barriers could be developed. The survey could be followed up by multiple cases in order to evaluate the findings gained from the survey.

References

Ansoff I.H. (1965) *Corporate Strategy*, McGraw Hill, New York.

Ansoff I.H. (1994) Comment on Henry Mintzberg's Rethinking Strategic Planning, *Long Range Planning*, Vol. 27, No. 3, pp. 31 - 32.

Argyris C. (1990) *Overcoming Organizational Defenses: Facilitating Organizational Learning*, Boston Allyn and Bacon

Argyris C., Putnam R. & McLain Smith D. (1985) *Action Science - Concepts, Methods, and Skills for Research and Intervention*, Jossey-Bass Inc. Publisher, London

Argyris C. & Schön D.A. (1978) *Organizational Learning: Theory Action Perspective.* Addison-Wesley.

Attewell P. (1992) Technology Diffusion and Organizational Learning: The Case of Business Computing, *Organization Science*, Vol. 3, No. 1, 1-19

Auer T. (1995) *Information Systems Related Organizational Maturity: A Conceptual Framework and an Assessment Method*, Doctoral thesis, Publications of the Turku School of Economics and Business Administration, Series A-7:1995

Beatty C.A. & Gordon R.M. (1988) Barriers to the Implementation of CAD/CAM Systems, *Sloan Management Review*, Vol. 30, No. 1, pp. 25-34.

Benbasat I., Goldstein D.K. & Mead M. (1987) The Case Research Startegy in Studies of Information Systems, *MIS Quarterly*, Vol. 11, September, pp. 369-386

Cohen W.M. & Levithal D.A. (1990) Absorptive Capacity: A

New Perspective on Learning and Innovation, *Administrative Science Quarterly*, Vol 35, pp. 128-152

Couger J.D. (1988) Key Human Resource Issues in IS in the 1990's: Views of IS Executives versus Human Resource Executives, *Information & Management*, Vol. 14, pp. 161-174.

Davis G.B. (1987) Strategies for Information Requirements Determination, in *Information Analysis*, Selected Readings, ed. Galliers, R, Addison-Wesley, Great Britain

Dodgson M. (1993) Organizational Learning: A Review of Some Literatures, *Organization Studies*, Vol. 14, No. 3, pp. 375-394.

Earl M.J. (1993) Experiences in Strategic Information Systems Planning, *MIS Quarterly*, March, Vol. 17, No. 1, pp. 1 - 24

Fitzgerald G. (1991) Validating New Information Systems Techniques: A Retrospective Analysis, in *Information Systems Research: Contemporary Approaches & Emergent Traditions*, eds Nissen H.-E., Klein H.K. & Hirschheim R., North-Holland, Amsterdam

Galliers R.D. (1991a) Strategic Information Systems: Myths, Reality and Guidelines for Successful Implementation, *European Journal of IS*, Vol. 1, No. 1, pp. 55†-†64.

Galliers R.D. (1991b) *Choosing Appropriate Information Systems Research Approaches: A Revised Taxonomy, in Information Systems Research: Contemporary Approaches & Emergent Traditions*, eds Nissen H.-E., Klein H.K. & Hirschheim R., North-Holland, Amsterdam

Grant R. M. (1991) The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation, *California Management Review*, Vol. 33, No. 3, 114-135

Huff S.L., Munro M.C. & Martin B.H. (1988) Growth Srages of End User Computing, *Communications of the ACM*, May 1988, Vol. 31, No. 5, pp. 542 - 550

Johnston H.R. & Carrico S.R. (1988) Developing Capabilities to Use Information Strategically, *MIS Quarterly*, 12(1), pp. 37-48.

Kim D.H. (1993) The Link Between Individual and Organizational Learning, *Sloan Management Review*, Fall, Vol. 35, No. 1, pp. 37-50.

Kling R. (1987) Defining the Boundaries of Computing Across Complex Organizations, in: *Critical Issues in Information systems research*, eds. Boland, R.J. & Hirschheim R., John Wiley & Sons, New York.

Kolb D.A. (1984) *Experiential Learning - Experience as a Source of Learning and Development.* Prentice-Hall, Englewood Cliffs.

Kwon T.H. & Zmud R.W. (1987) Unifying the Fragmented Models of Information Systems Implementation, in *Critical Issues in Information Systems Research*, eds. Boland, R.J. & Hirschheim R., John Wiley & Sons, New York.

Lederer A.L. & Mendelow A. L. (1988) Convincing Top Management of the Strategic Potential of Information Systems. *MIS Quarterly*, Vol. 12, No. 4, pp. 525-534.

Lederer A.L. & Sethi V. (1992) Root Causes of Strategic Information Systems Planning Implementation Problems, *Journal Management Information Systems*, Summer, Vol. 9, No. 1, pp. 25-45

McFarlan F.W. (1984) Information technology changes the ways you compete, *Harvard Business Review*, 62 (3), pp. 98-103.

Mintzberg H. (1994) Rethinking Strategic Planning Part I: Pitfalls and Fallacies, *Long Range Planning*, Vol. 27, No. 3, pp. 12 - 21

Mintzberg H. (1994) Rethinking Strategic Planning Part I: New Roles for Planners, *Long Range Planning*, Vol. 27, No. 3, pp. 22 - 30

Nelson R.R. (1991) Educational Needs as Perceived by IS and End-User Personnel: A Survey of Knowledge and Skill Requirements, *MIS Quarterly*, Vol. 15, No. 4, pp. 503 - 525.

Nordhaug O. & Grönhaug K. (1994) Competence as Resources in Firms, *The International Journal of Human Resource Management*, Vol. 5, No. 1

Porter M.E. (1980) *Competitive Strategy*, Free Press.

Porter M.E. (1985) *Competitive Advantage*, Free Press.

Porter M.E. (1991) Towards a Dynamic Theory of Strategy, *Strategic Management Journal*, Vol. 12, pp. 95 - 117

Prahalad C.K. & Hamel G. (1990) The Core Competence of the Corporation, *Harvard Business Review*, May - June, pp. 71 - 91

Reponen T. (1993) Information Management Strategy - An Evolutionary Process, *Scandinavian Journal of Management*, Vol. 9, No. 3, pp. 189-209

Reponen T. (1994) Organizational Information Management Strategies, *Information Systems Journal*, 4, pp. 27-44.

Rogers E.M. (1983) *Diffusion of Innovations*, New York, Free Press

Ruohonen M. (1990) Action Learning in Information Management Education, *Education & Computing*, no. 1-2, 137-146.

Ruohonen M. (1991) Stakeholders of Strategic Information Systems Planning - theoretical concepts and empirical examples, *The Journal of Strategic IS*, Vol. 1, No. 1, pp. 15-28.

Salmela H. (ed) (1990) *Evolutionary model for the Development of Information Systems Strategy* (Finnish version only). Publications of Turku School of Economics and Business Administration, Series A-4.

Salmela H. (1993) Designing Information Systems for Changing Organizations, *Proceedings of the 1993 ACM SIGCPR Conference*, April 1-3, 1993 St. Louis, Missouri, pp. 243 - 254

Senge P.M. (1990) *The Fifth Discipline*, Doubleday, New York.

Senge P.M. & Fulmer R.M. (1993) Simulations, Systems Thinking and Anticipatory Learning, *Journal of Management Development*, Vol. 12, No. 6, pp. 21 - 33.

Sullivan C.H. Jr. (1985) Systems Planning in the Information Age, *Sloan Business Review*, Vol. 26, No. 2, pp. 3-11.

Vitale M.R., Ives B. & Beath C.M. (1986) Linking Information Technology and Corporate Strategy: An Organizational View. *Proceedings of the Seventh ICIS*, San Diego, pp. 265-276.

Weick K.E. (1993) Organizational Redesign as Improvisation, in: *Organizational Change and Redesign: Ideas and Insights for Improving Performance*, eds. Huber, G.P. & Glick, W.H., Oxford University Press, New York

Zmud R.W. (1983) *Information Systems in Organizations*, Scott, Foresman and Company, Tucker, GA.

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