

Proceedings of the First European Doctoral Seminar on Strategic Information Management

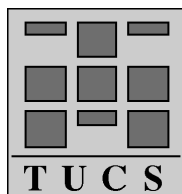
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EDITORIAL

Organizations are heading towards transformations that are either activated or supported by the use of information technology. New and emerging fields of information management studies are many. Organizations transform in line with their information systems. In many cases organizational and individual learning is needed to ensure successful use of IT. Information systems are also crossing organizational boundaries and even national borders. Outcomes from these phenomena are inter-organizational systems, group systems and electronic commerce applications. Management of information resources is facing many challenges and problems, such as IS evaluation, quality and service.

The objective of the first European Doctoral Seminar on Strategic Information Management (EDSIM) was to:

- (i) evaluate the recent research topics in the field of information management,
- (ii) give guidance to doctoral students in their thesis work, and
- (iii) discuss the European perspective in information management.

All three objectives were achieved successfully during the seminar in Turku, Christian Institute. EDSIM was an initiative by SISNET network which concentrates on providing teaching and research on the field of strategic information systems and information management. Our seminar was well-focused and achieved the niche audience of European scholars and doctoral students who are interested especially in managerial perspective of IS research. Our seminar gathered a representative audience from UK, Sweden, the Netherlands, Finland and even from non-european countries such as China and Nigeria.

We want to pick up some of the key themes and findings from the flow of discussions. Associate Professor Jaak Jurison made a keynote on Global Issues of IS Management in which he provided several options to start global IS research. The most important is to focus and find the most appropriate approach while global IS research is laborous and costs more than traditional IS research. Use of IT , such as email and web, in this effort is also recommended. Professor Tapio Reponen pinpointed the meaning of learning in IS strategy formulation and research. Shared understanding amongst different stakeholders is needed to communicate the vision for information systems development. However, explication of knowledge is the key problem. We need approaches where tacit business visions can be transformed explicit IT applications. Codification might

be a too challenging objective, but if we can create, as researchers, a creative planning and design environment through action research and other customer-oriented methods, we are gaining more relevance for our research. Professor Bob Galliers provided many avenues for improving relevance of information management research. European IS research seem to be more focused on relevance than rigor issues which has direct implications to selection of research approaches and methods. One of the key things is also dissemination and academic marketing of your research. With constant dialectics with business managers you can validate your research and provide relevant results.

Doctoral presentations were all from key research areas, such as IS evaluation, management of time-critical reporting, global IS on different contexts, SIS plan implementation factors, organizational transformation through IT and quality planning for SISP. All these topics with keynote viewpoints are published in this proceedings.

EDSIM organization is grateful for the sponsors of the seminar; EU Socrates funding, Doctoral Program of Information Systems Science in Finland, Turku School of Economics and Business Administration; Institute of Information Systems Science (IIS) and Turku Center for Computer Science (TUUS). Special thanks belong to the soul of the seminar, professor Tapio Reponen who was one of the initiators of this project, professor Pieter Ribbers, chairman of SISNET, all the organizers and participants, especially to Birgit Haanmäki, Secretary to IIS, who has been the backbone of the seminar.

We are looking forward to the next EDSIM meeting.

September, 1996

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AGENDAS FOR RESEARCH AND PRACTICE IN INFORMATION SYSTEMS MANAGEMENT

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ABSTRACT

This seminar aims to question why it is we undertake research in the field of information management. By focussing on the differences between the different agendas of academics and practitioners in this field, conclusions are drawn with regard to the need to align more closely the two agendas so that the results of our research are more readily available and implementable in practice. The seminar concludes with a manifesto for future research activity in the field of strategic information management.

INTRODUCTION

The reasons for undertaking research in an applied field such as strategic information management presumably includes a desire to understand better the issues confronting practitioners, so that practice can be improved and greater utility obtained from our investment and use of information technology. While we seek improvements in our theories, the real test relates to the applicability of our theories in practice.

The seminar proceeds as follows:

1. Personal agendas for undertaking research in the field of strategic information management are identified.
2. Issues confronting the practitioner communities of the USA and UK are highlighted as examples.

3. These are then compared with the research agendas in these two countries.
4. Conclusions are drawn with respect to the interdependency of the worlds of reseach and practice.
5. The research methods adopted by the two communities are contrasted.
6. Issues associated with the international/global dimension of the field are introduced.
7. A manifesto for future activity in the field is introduced as a synthesis of the learning arising from the seminar.

RESEARCH AGENDAS

When questioned as to why they were undertaking research in the field of strategic information systems management, a number of the Doctoral students present indicated that they were concerned to understand better the complex problems associated with the topic and, thereby, improve practice. This suggests that the agendas for the research and practitioner communities should be closely aligned.

In fact, however, this is not the case - at least, not so far as the USA and UK are concerned. Evidence from survey research in the two countries suggests that the agendas of the two communities are quite some distance apart (Teng & Gallena, 1990; Niederman, et al., 1991; Galliers, et al., 1994). In the USA for example, the top five most critical strategic information systems management (SISM) issues compared with the topics being researched are compared in the following table:

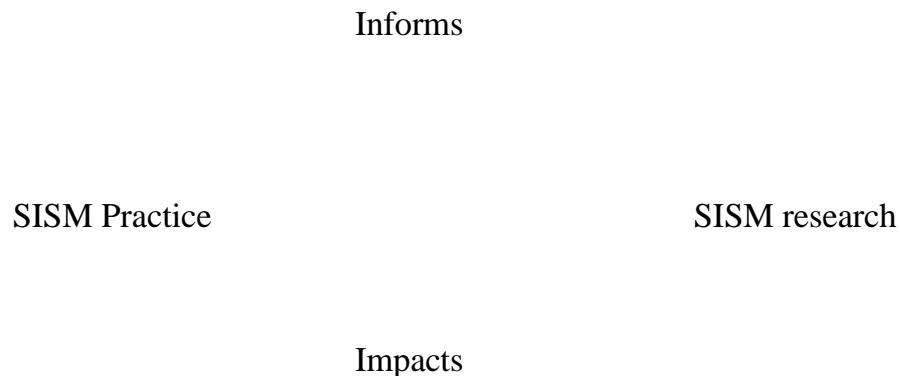
Critical Issues	Research Topics
1. Information architecture	1. DSS
2. Effective use of data	2. AI
3. Strategic IS planning	3. DBMS
4. IS human resources	4. EIS development
5. Organisational learning re IT	5. Human factors

Source: Teng & Gallena, 1990; Niederman, *et al.*, 1991

Similar issues (with the addition of business process re-engineering, given that the survey was conducted more recently) are found in the UK (Galliers, *et al.*, 1994), but little is, as yet, known regarding the overall picture for IS research in that country¹. However, from an informal review of research activity, there is no reason to believe that a similar gap in the two agendas will not be found.

THE INTERDEPENDENCY OF STRATEGIC INFORMATION SYSTEMS MANAGEMENT RESEARCH AND PRACTICE

Given the above arguments, it might be presumed that the interdependency of the researcher and practitioner agendas would be something like that shown in the following figure:



¹ A study is currently underway at Warwick Business School, which will provide this information sometime in 1997. In addition, an update of the Galliers *et al.*, 1994 survey is also being undertaken.

The argument here is not that one agenda should dictate to the other; rather that they are mutually interdependent. It would appear from the above analysis that the actual situation looks more like the following, however:

SISM Practice Informs SISM Research

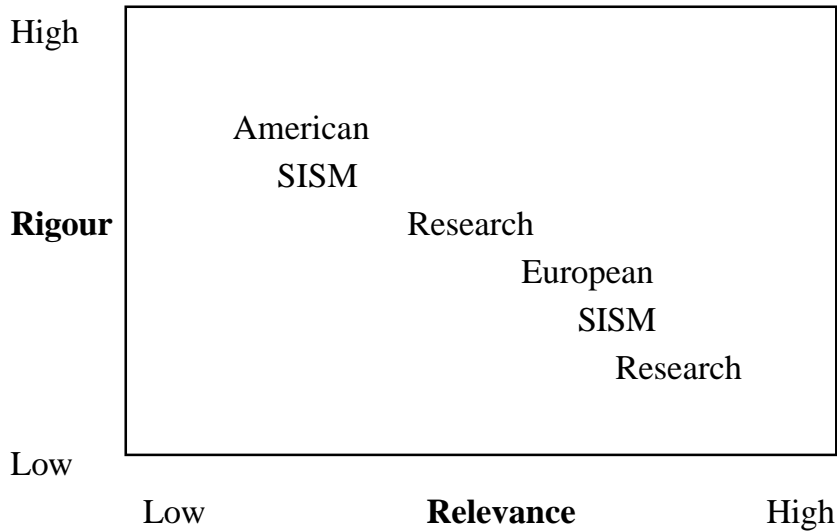
with little contact being made between the two communities. Practitioners network with each other (Swan - Newell 1995), and the research community disseminates its results in scholarly journals and at academic conferences. There are few examples² of the SISM research community actively disseminating the results of their work for the benefit of practitioners.

RESEARCH METHODS

The problem is exacerbated by the research methods often employed by the academic community. In the hope of being accepted in the (social) scientific community, I.S. researchers tend to emphasise laboratory experimentation and (postal) survey research (Galliers 1995). Active interaction with the practitioner community (e.g. through case study, fieldwork and action research) is, as a result, quite limited. Rigour - and academic acceptability - seems to be emphasised at the expense of relevance. This would appear to be especially true in North America, where there is considerable weight placed on intricate quantitative analysis of (sometimes quite limited) data. The following figure³ illustrates the point:

² Warwick Business School's *Hot Topics* series being an exception.

³ The figure is illustrative only and should not be interpreted too literally. The figure emerged from discussions with Kalle Lyytinen in Hong Kong in 1993.



Questions arising out of this analysis include:

- Who decides what is relevant?
- How do we measure rigour? (i.e., what is considered rigorous will depend to a large extent on the philosophical stance to research that is adopted).

THE INTERNATIONAL DIMENSION

The different stances taken to SISM research lead us on to another important topic of debate. There has been, at least until recently, a North American bias in the SISM literature, given that there were few non-North American journals dealing with related topics. The situation has changed in recent years, however, with the emergence of, for example, the *Journal of Strategic IS*, the *European Journal of IS* and the *IS Journal* (all published in Europe), and the *Australian Journal of IS*, to name but four (relatively) new releases.

There remains a bias in our approach to the topic, however, as articles appearing in each of these journals are written primarily by and for English-speaking countries. It is notable that we in the English-speaking world know little about the agendas in, for example, France or Germany, Japan or Korea. There is a danger, therefore, that we indulge in conceptual as well as technological imperialism in the world of SISM, especially when it comes to the application and management of IT in developing countries. In addition, there is

an opportunity - rarely taken, unfortunately - of us learning from other cultures. After all, we do claim, don't we, that our field is a global one?

SYNTHESIS: Towards a Manifesto for Future Action

Key lessons arising from this analysis are the following:

1. Reconsider the focus of our research. (Take into account the issues facing the practitioner community.)
2. Disseminate the results of our research more widely (i.e. outside the academic community, as well as within it).
3. Emphasise *in situ* research at the expense of laboratory experimentation and postal surveys.
4. Improve the quality of SISM research by paying attention to the issues of relevance (cf. a stakeholder perspective) and rigour **in context**.
5. Place greater emphasis on international and cross-culture issues, thereby avoiding the Anglo-Saxon bias of our current agenda.

POSTSCRIPT

Research in the field of SISM can be quite daunting at times: technological advances are rapid, and the issues we attempt to confront are complex. There is nothing like positive feedback in keeping up momentum and raising the spirits. Seeing the fruits of one's research in practice is therapeutic indeed, and access to busy executives is eased the more one's work is seen to be relevant and helpful.

Useful references in undertaking SISM research include Gable (1994), Galliers (1992), Galliers - Baker (1994) and Phillips - Pugh (1987).

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GLOBAL ISSUES OF IS MANAGEMENT

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Introduction

Global information systems (IS) management, the management of information technology (IT) to support and enhance global business operations of a firm, has gained significant importance in recent years. Globalization is creating new competitive pressures on business firms requiring new ways of coordination and managing worldwide business operations. Companies are increasingly turning to IT for solutions to these challenges. IT has become a key enabler for conducting business across many continents; international business as it exists today, could not be possible without IT.

While IT can create many new opportunities for global business, it can also bring about new issues and management challenges. The purpose of this paper is to examine these issues in the context of past and present IS research. These issues are important because they can help business managers to develop effective strategies for global business. They can also provide guidance for IS education and research. Because global IS as a research area is relatively new, the stream of global IT literature is presently limited. As a result, there are many research opportunities for those interested in this new and exiting field.

Current research

A common classification scheme views research according to the type of studies. Four general types of studies can be found in global IS literature: issues surveys, case studies, comparative studies, and cross-cultural studies (Senn, 1994).

Issues surveys. Most surveys to date have been focused on identifying key issues and concerns of either IS managers of multinational enterprises or IS managers in different nations or geographic regions. The objective of one group of studies has been to identify and explain regional similarities and differences. Palvia and

Palvia (1996) have summarized these studies and postulated a tentative model to explain the differences as a function of a country's level of economic development. Another group of studies (e.g. Deans et. al., 1991) is based on surveys of multinational corporations designed to differentiate global IT management issues from domestic concerns.

Case studies. The second category of research is based on case studies. These studies explore how IT is used by multinational firms or how IT is used worldwide. They also examine how firms deal with specific issues, how they overcome various barriers to global systems and how they resolve organizational issues. While these studies provide useful insights, they are limited to a single firm's experience and consequently suffer from generalization problems.

Comparative studies. These studies are concerned with IT capabilities and practices in various countries. Typically they examine the level and characteristics of IT infrastructure, the availability of computers, the use of IS standards, and the quantity and quality of skilled IS professionals. While most of these studies provide an in-depth analysis of a single country, a few also compare the differences and commonalties across countries or regions. These studies are useful for practitioners and researchers who are interested in a specific country or region.

Cross-cultural studies. This class of studies attempt to identify and explain similarities and differences in IT management across different countries and cultures. Of particular interest are management issues involving systems development and implementation. In general, these studies examine the impact of culture on outcomes, and highlight the importance of organizational and cultural issues in IS management.

Concerns for future research

All studies to date represent isolated attempts to develop an understanding of global IS. As research in this area advances, we need to adopt a more systematic approach that would permit to develop theory in a cumulative tradition. We need to go beyond issues and case studies and build on each other's research. To do that we need a comprehensive framework for sharing ideas, common definitions,

and concepts upon which to build our knowledge. Our present frameworks are too fragmented and are therefore of limited use to IS researchers. The most widely known framework for global business strategies by Bartlett and Goshal (1989) has been useful for guiding some IS studies. IS oriented frameworks (e.g. Deans and Ricks, 1991; Ives and Jarvenpaa, 1991) offer a good start, but need to be developed further. Senn (1994) suggests a preliminary and more comprehensive framework for international IS research. The framework is based on five sets of independent variables (industry, corporate, national/regional, national IT, and global IT) and measures of IT outcome as a dependent variable.

Opportunities and challenges

Being a new field, global IS offers almost unlimited opportunities for research. For example, it would be of interest to explore relationships among the different variables in Senn's framework. Finding IS factors that determine global business success or global IS success would be another interesting area with many practical implications. In addition, the role of IT industry and infrastructure are still not well understood and merit serious studies. Global IS research can also benefit from a variety of methodologies. It appears that in this area of research we might gain more insight from qualitative research than from quantitative studies.

In summary, global IT is an exciting new field for research that can offer substantial awards for those willing to accept these challenges. However, it is difficult and expensive. Collecting data from various parts of the world takes time and costs money. The same barriers that limit effective IT practice in business also tend to be barriers for global IS research. This includes language and cultural barriers. A questionnaire developed in one language can be interpreted differently when translated to another language. But the cost barrier is probably the most difficult to overcome, particularly for doctoral students. However, there are many opportunities for reducing costs. For example, costs can be reduced by having colleagues in other parts of the world to collect data, using Internet for global communication and learning, or taking advantage of various government and business sources for research grants. Because of the inherent expenses associated with global studies, researchers need to plan carefully and have a clear focus on the objectives and goals.

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EXTERNALIZATION IS THE KEY FACTOR IN INFORMATION SYSTEMS STRATEGY GENERATION

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Abstract. Widely accepted objective of Information Systems Strategy Generation is the alignment of business and Information Technology. There are several models and frameworks for this alignment process, but still the results are often disappointing. This viewpoint presents an assumption that the main reason for a failure is the poor externalization of actors' internal knowledge. This assumption is based on empirical observations as an facilitator in several planning processes. Thus much more emphasis should be put on the externalization process to improve the alignment and the implementability of strategies. One example is given on the ways to promote planning.

Alignment. The strategic planning of information systems can be defined as an interactive learning process for the creation of a strategy for business process redesign and development incorporating information technology (Reponen, 1994). The main objective is to create guidelines for such information systems development that supports business strategy, culture, infrastructure and processes of the organization. The overall framework of alignment has been well presented in Venkatraman (1991).

In business strategy literature you can find three different approaches: descriptive, prescriptive and rescriptive (Carlsson, 1991). In the descriptive approach the objective is to describe the process of creating the strategy. Prescriptive approach is a normative planning approach which aims at giving recommendations and general lines for strategy implementation. Rescriptive is between these two approaches, it tries to combine the expertise of decision makers into decision models. In IS planning there is a need to combine descriptive and prescriptive thinking, but the problem is how to do it.

There are several frameworks and methods for information systems planning, in which interaction and learning has been increasingly emphasized. One of the main objectictives in the strategy is to create a plan to gain competitive advantage for the organization. This advantage may be gained in many different ways, both

with strategic and operative applications. But benefits of using IT can be achieved only after the applications are in use. The most important objective is to have a good overall management of all information resources.

A key to an implementable strategic plan is a good internalization of the nature and objectives by all members of the organization. The stakeholders should be very well aware of the intentions created during the strategy process. In this sense the knowledge creating is a very important aspect of strategic planning. Nonaka and Takeuchi have created an interesting framework for knowledge creation and an attempt is made to apply their thoughts into information systems strategy generation. The main problem is to make the human knowledge explicit.

Externalization. Nonaka and Takeuchi define knowledge, tacit knowledge and knowledge creation in the following way:

“**...Knowledge...** is about beliefs and commitment, ...a function of a particular stance, perspective, or intention...action It is context specific and relational. Knowledge is essentially related to human action.... **Tacit knowledge** is personal, context-specific, and therefore hard to formalize or communicate.... **Explicit... knowledge...** refers to knowledge that is transmittable in formal, systematic language.”

In strategic planning the role of tacit knowledge is extremely important. Organizational actors have their own business experience, understanding and their objectives for organizational development. All the business operations are actually based on their internal thinking, which they make explicit through their speech, writing and actions. During the strategy process the shared understanding on the intended direction should be increased. To achieve this goal the members of the organizations should have some understanding on the tacit thinking of the others. Nonaka and Takeuchi call this process as externalization, which is knowledge conversion from tacit to explicit knowledge.

My experience is that this externalization is the most important element in strategy generation. The final objective in IS Strategy is to build well functioning software for the organization. Software development is very concrete work where every line of the code is an objective fact. Moving from human subjective thinking to these objective facts is very difficult but also decisive for the success of the strategy. Good working methods for this stage are urgently needed.

According to Nonaka and Takeuchi:

“Tacit knowledge becomes explicit, taking shapes of metaphors, analogies, concepts, hypothesis or models. When we attempt to conceptualize an image, we express its essence mostly in language... Externalization holds the key to knowledge creation, because it creates new, explicit concepts from tacit knowledge. **Metaphor** is a way of perceiving or intuitively understanding one thing by imaging another thing symbolically... Creative, cognitive process continues as we think of the similarities among concepts and feel an imbalance, inconsistency, or contradiction in their association, thus leading to a discovery of new meaning or even to the formation of new paradigm.”

Their suggestion for externalization is nominating self-organized teams and using metaphors as an important working method. Interaction between participants is extremely important and increasingly needed. With this interaction it is possible to reach a shared vision on objectives and targets. This offers good basis for the planning of the actions needed to meet the objectives. In IS field normative actions are also needed, otherwise systems development is impossible. Therefore, externalization of the tacit knowledge is decisive on the success of the strategy.

Strategy generation. As defined above IS strategy generation should be an interactive learning process. Its main difficulty is to externalize the tacit knowledge which each organization has largely. Nonaka’s definition to learning is very descriptive and proper for IS strategy processes: “Organizational learning process is a continuous and dynamic interaction between tacit and explicit knowledge. This interaction is shaped by shifts between different modes of knowledge conversion, which are induced by several triggers.”

In the EMIS-framework (Reponen 1994) these problems have been solved with a multiple participant and multiple method approach. EMIS has been developed during last ten years in several empirical planning processes integrating existing theoretical thinking into the practical needs. Externalization of tacit knowledge has been done by nominating several teams with their own objectives and with wide participation of different stakeholders. Team members have made a large number of interviews trying to chart the internal thoughts of organizational actors. Additionally they have had brainstorming sessions,

planning sessions and discussions. Also several outside lectures on the role of technology in business organizations have been presented.

With this kind of working methods it has been possible to promote the mutual understanding and stress the importance of technology in present business world. IT has a supportive but at the same time very decisive role in business operations. The several empirical applications of EMIS model clearly verify the Nonaka and Takeuchi's thinking and verify the importance of tacit knowledge.

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PRE/POST — ANALYSIS OF IS REQUIREMENT: AN APPROACH TO IMPROVE IS-SUCCESS

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Abstract

There is a gap between information systems planning and the quality of the delivered information system. This gap has seldom been analyzed or evaluated. This paper presents a theoretical conceptual framework for analyzing the gap between ISP and the information systems in use. The relation between ISP and the quality of the information system is explained. In conclusion, the paper suggest the addition of quality planning into ISP.

1. INTRODUCTION

Twenty years ago, less than one percent of the business environment could have intelligently describe what “computer software” meant. Today, most organizations and many members of the public at large feel that they understand their software and information need. Nowadays there are several software applications for different purposes. Classifications of software into different categories is therefore, reasonable. Although it is somewhat difficult to develop meaningful generic categories for software applications. Pressman (1994) indicated the breath of potential applications, they include; System Software (e.g. operating systems or component); Real-Time Software; *Business Software*; Engineering and Scientific Software; Embedded Software; Personal Computer Software; and Artificial Intelligence Software.

This paper concentrate on the business software applications. Business information processing is the largest single software application area (Pressman, 1994). “Discrete ‘systems’ (e.g. payroll, accounts, inventory, etc.) have evolved into management information systems (MIS) software that accesses one or more large databases containing business information. Applications in this area restructure existing data in a way that facilitates business operations or management decision making. In addition to conventional data processing

application, business software applications also encompass interactive computing (e.g., point-of-sale transaction processing) (Pressman, 1994, pp.15-16).

In this paper business software application is been referred to in general as management information system (MIS) or simply information system (IS). The purpose of this paper is to clarify the gap between the planned management information system (MIS) requirement definitions and the requirement definitions of the developed system. Furthermore, the paper also present a theoretical framework for analyzing the gap.

The quality of IS have been greatly researched however research have rarely focused on how information systems quality should be planned and how the planned quality should be integrated into the development process in other word implemented. The paper is divided into the following sections.

Section two present ISP, the background of the study. Section three present methods for evaluating the quality of ISs (IS-failure and IS-success). In section four the theoretical framework for analyzing the gap between the pre-IS requirement and post-IS requirement is presented.

2. BACKGROUND: INFORMATION SYSTEMS PLANNING (ISP)

To understand the problem this paper is addressing a good explanation of information system planning (ISP) is necessary. One key output of information systems planning is the requirement definition. In this paper it is called the Pre-requirement definition. Lederer and Sethi (1992) define Strategic information systems planning (SISP) and ISP “as the process of deciding the objectives of computing for an organization and then identifying the applications that the organization should computerize”.

Lederer and Gardiner (1992) noted that ISP identifies broad initiatives, specific applications, and critical technologies to help their organizations carry out their current business strategy more successfully. Salmela and Lederer (1996) listed a number of SISP benefits from literature, one important element is that it can define technology policy and architecture.

Reponen (1993), stated that in a case study report “the BSP⁴-report furnished a detailed analysis of information needs in different parts of the organization, a plan for data management and suggestions for the technical realization of the

⁴ BSP is one of the most widely planning methods for SISP. Its objective is to help in developing an information system which satisfies the information needs of the organization.

information system. The outcome of the BSP-analyze was a proposition for a large relational database.” Many frameworks and methods have been developed and used for carrying out information systems planning. Reponen (1994a) referred to a representative list of the methods and frameworks for carrying out SISP, they include:

Business Systems Planning (BSP) (IBM, 1984)

Critical Success Factor (CSF) (Rockart, 1979)

Strategic Grid (McFarlan &McKenney, 1983).

Evolutionary Model for Information Management Strategies (EMIS)
(Reponen, 87)

Focus shall be on the EMIS framework figure 1 below, because it's very flexible. It can be applied in planning many kinds of information systems for several organization. It has been tested with many case studies that produced successful results (Finpap/Finboard, 1988; Reponen, 1994a). Galliers (1993) comments that “it is becoming generally accepted that a key to successful information systems planning lies in the integration of the *information systems plan* with that of the *business* on the one hand, *and information systems development* on the other. While there is general agreement that there should be this integration, it is still the case that in many organizations the linkage is tenuous, at best”. EMIS provide a good bases for such an integration, it allows the use of an appropriate methodology or framework in each situation.

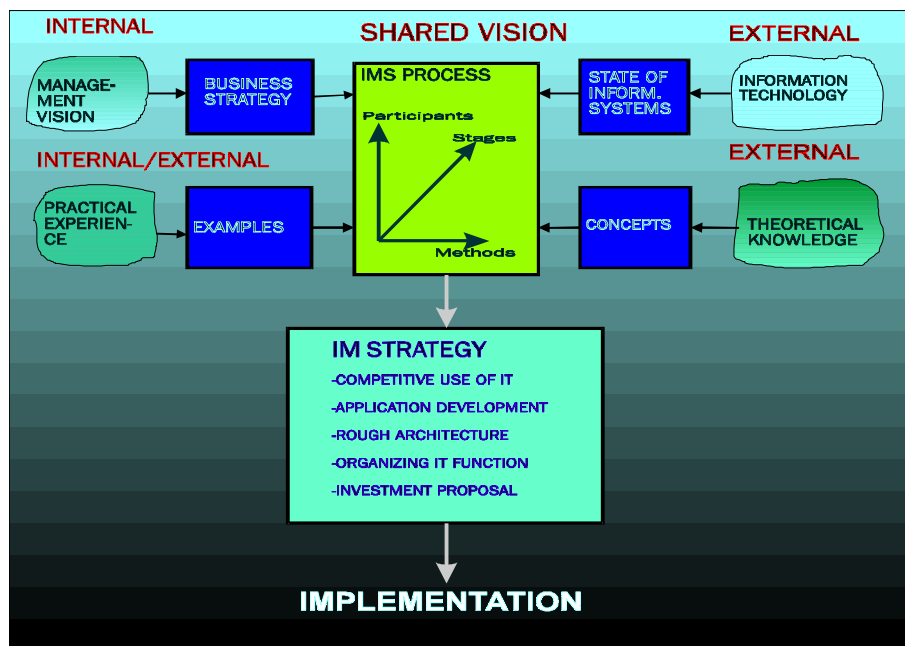


Figure 1, The elements of the EMIS Model. Revised from Reponen (1987)

One key output of the EMIS model is the provision for a long-set of guidelines for directing, implementing and supervising information resource management (Reponen, 1993). Elements of the EMIS model are shown in figure 1 above. It is clear from the picture above that the EMIS model creates an opportunity to defining the requirement definition for an information systems before the actual development.

Galliers (1993, pp.201), however, pointed out that “a key question is often overlooked. This relates to the difficulty that managers and information systems professionals alike have in determining the key information requirements to meet individual needs, and just as important– if not more so– key information requirements and flows throughout the organization”. This is certainly seen as being a major issue by IT directors, who cite developing an ‘information architecture’ as the single most critical issue they face at present (Niederman et al., 1991).

From the discussion above, it clear that ISP should identify and define the Pre requirements for an information system. Unfortunately, the post requirement specifications are usually different from the Pre requirements. Another problem with ISP is that the computer system development projects often produce computer systems of low systems quality even when ISP tend to guide it in the desired direction. Lyytinen (1987) indicated that this can be seen from both use and technical aspects.

3. METHODS FOR EVALUATING IS QUALITY

3.1 IS-Failure

The gap between pre-IS requirement and post-IS requirement can be viewed as a kind of information systems failure. IS failure can be regarded as a gap between stakeholders' expectations expressed in some ideal or standard and the actual IS performance (Lyytinen, 1987). Lyytinen and Hirschheim, (1986) noted that many reports show that somewhere between one third to half of all systems fail (Stegmuller, 1984) and some researchers have reported even higher failure rates (Gladden, 1982; Sibley, 1986). According to a survey by Gladden, (1982) 75% of all systems development undertaken is either never completed or not used if completed. This is "a situation which poses a considerable challenge to the information systems community (Lyytinen and Hirschheim, 1986)". The concept of expectation failure was developed to better understand the IS problem (Lyytinen, 1986, Lyytinen and Hirschheim, 1987). The expectation failure assumes that there is no 'general' IS failure; rather failure poses problems for someone or some group. This group of people are referred to as stakeholders. Ruohonen(1995, pp.135) define two groups of stakeholders; external and internal stakeholders. Different stakeholders do not generally share the definition of an organization's 'problem' and do not in general share the same 'solution' (Mitroff, 1983, pp.5). According to Mason and Mitroff (1981, (pp.43)) stakeholders are defined as 'all those claimants inside and outside the organization who have a vested interest in the problem and its solution'.

Expectation failure represents evaluative dispositions, which are derived from the stakeholders' common pool of values. Some of the expectations, however, are always formulated explicitly to justify the effort and investment in IS. "These are described in terms of systems requirements, goals, and design standards" (Lyytinen and Hirschheim, 1986). They further explain that failure therefore has been defined "as the inability of an IS to meet a specific stakeholder group's expectations". Failure does not, therefore, involve only the system's inability to meet requirements, as only a fraction of stakeholders' concerns are usually formulated in them. Many IS failures actually have met the requirements, but they have been considered failures because some other vital concerns have not been catered for.

Lyytinen and Hirschheim, (1986) argued those concepts of failure that are most often employed are vague, and they all suffer from conceptual weaknesses.

Some other examples of IS failure in literature's are: when the potential benefits of the IS are not realized (Alter and Dinzberg, 1978), when the IS is not used (Lucas 1975), when the users' attitudes are negative (Bailey and Pearson, 1983), when there is substantial user resistance (Markus, 1983), or when a functioning system is not delivered (Gladden, 1982), or when an IS cannot be managed (Sauer, 1993). Unfortunately, expectation failure, and most of the other types of IS failure identified in literature, do not cover how it comes about.

The expectation failure gives some relevant contribution to this research problem. This is because the expectation failure concept gives some valuable explanation to why there is a gap between the pre/post requirements specification of an IS. However, the expectation failure does not say anything about how the gap can be analysed. Nor does it give others reason for the gap. Furthermore the expectation failure, although it helps in understanding this gap better, does not assist in showing how a quality system can be developed.

3.2 Reason for IS Failure

One may ask what is the difference between the IS Failure types and IS Failure reasons. The distinction is of course relative and depends on how boundaries of the situation are drawn; however, reasons and failure types are conceptually different (Lyytinen and Hirschheim, 1987). Three criteria for distinguishing one from the other is suggested. "First, failure reasons are factors and situations which lie outside the IS. They belong to the environment. Secondly, failure reasons are believed to have causal precedence over failure and are not assumed to be caused by any higher-order reason. Thirdly, failure reasons must have some 'causal' connection to failure, i.e. they must co-produce problems by conditioning or affecting behaviors and arrangements that produce the failures (Lyytinen and Hirschheim, 1987).

The body of literature on reason for failure provides a good contribution to why there is a gap between the Pre/Post IS requirements definition. Lyytinen and Hirschheim (1978) identified four major groups for failure reasons. Each was further sub-divided into twelve failure classes, see table 1 below. Although, the boundaries between these twelve classes are not clear, they point out distinct reasons for IS failure. Studying the reasons for IS failure may therefore help to understand why there is a gap between the Pre and post IS requirement. It will also help to clarify the contribution this paper hopes to make in finding some new reasons for IS failures.

<i>Reason for Information Systems Failure</i>		
<i>Group</i>	<i>Content</i>	<i>Type of reason</i>
IS	(1) Technical and operational reasons – lack of sophisticated technology	mostly uncontrolled
IS Environment	(2) Individual reasons – lack of fit of the IS to users' capabilities (cognitive style, stress adaptation, motivation) (3) Organization reasons – lack of fit of the IS to the rest of the organization (age, stage, context, etc.) (4) Environmental reasons – lack of fit of the IS to operating organization environment (stability of IS function, organizational incentives etc.)	mostly uncontrolled mostly uncontrolled mostly uncontrolled
ISD	(5) Method-based reasons – lack of adequate and powerful methods (6) Decision-making-based reasons – lack of sufficient attention to types of decisions supported (7) Work-based reasons – lack of sufficient attention to nature of work (8) Contingency reasons – lack of sufficient attention to contingency factors in ISD (type of system, development environment, risks, etc.) (9) Implementation reasons – lack of sufficient attention to organizational implementation (10) System assumption-based reasons – insufficient attention to biased or wrong assumptions that drive ISD	Controlled Controlled Controlled Controlled Controlled
ISD Environment	(11) Analyst-based reasons – IS professionals' insufficient cognitive and social skills, and too limited behavioral codes (12) User-based reasons – Users' insufficient skills and capabilities, and their limited knowledge of computing	Controlled Controlled

Table 1 Classification of IS failure reasons. Adapted from (Lyytinen and Hirschheim 1987)

3.3 IS Success

The second important factor related to IS use is the categories of information systems success. The gap between pre/post IS requirement can also be seen as a lack of IS-success criteria. The knowledge gained from IS failure may help in understanding IS success. However, the literature on IS success makes it clear that the reason for IS failure and IS success may not coincide necessarily. “There is not only a quantitative, but also a qualitative difference” between IS failure and IS success (Lyytinen and Hirschheim, 1987). “For example, the acquisition of a more powerful computer may remove a performance bottleneck, but this does not necessarily make the IS successful. Success might require changes in user education, organizational arrangements, or even the abandonment of IS altogether. Second, traditional IS success assessment emphasizes more ‘summative’ evaluation of IS (i.e. what occurred), whereas failure studies focus more on reason why something occurred, i.e. formative reason” (cf. Lyytinen and Hirschheim, 1987).

Therefore, studying the literature on IS success will be useful in analyzing the gap between the pre and post requirement definitions. DeLone and McLean (1992) reviewed over 180 articles in an attempted to find the factors that contribute to IS success, and if possible define what they are. The result of their work was a taxonomy, which classifies IS success into the following six categories System Quality, Information Quality, Use, User Satisfaction, Individual impact and Organizational impact. Figure 2 below show the categories of IS success in relation to earlier developed models. However, there has been two earlier works that have classified IS success.

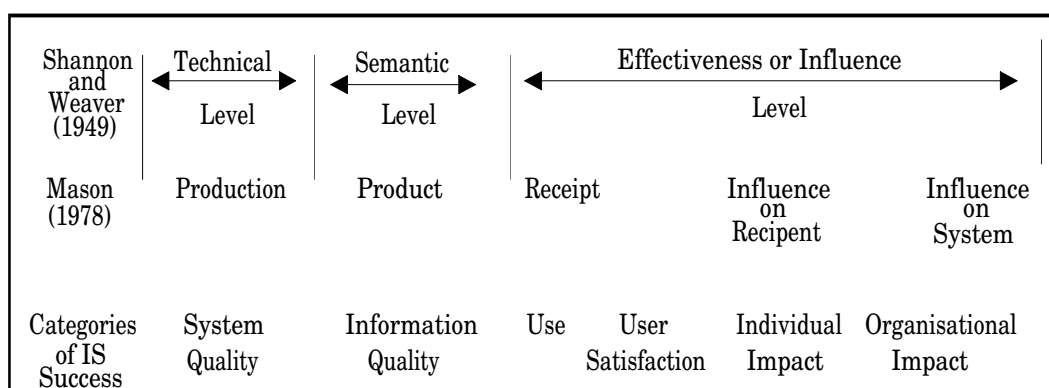


Figure 2. Categories of IS Success. Adapted from DeLone and McLean (1992).

As early as 1949 in their pioneering work on communication, Shannon and Weaver defined three levels of IS success (cf. DeLone and McLean, 1992). The “technical” level as the accuracy and efficiency of the system, which *produces* the information, the “semantic” level as the success of the information in *conveying* the intended meaning, and the “effectiveness” level as the *effect* of the information on the receiver. Building on Shannon and Weaver, Mason (1978) relabeled “effectiveness” as “influence” and defined the influence level of the information to be a “hierarchy of events which take place at the receiving end of an information system which may be used to identify the various approaches that might be used to measure output at the influence level” (Mason 1987, pp.227). This series of influence events includes the recipient of the information, an evaluation of the information, and the application of the information, leading to a change in recipient behavior and a change in system performance. See figure 2.

DeLone and McLean (1992) suggested another classification of IS success as shown in the figure 2. Looking at the first of these categories in figure 2. The System Quality has focused on the desired characteristics of the IS itself which *produces* the information; The Information Quality is the *product* of the desired characteristics; At the influence level is Use and User Satisfaction, this is the *interaction* of the information product with the recipients, the users and/or decision makers; The Individual Impact is the influence, which the information product has on management decisions; and finally the Organizational Impact is the effect of information product on organization performance.

The concept of level of output from communication theory demonstrates the serial nature of information (i.e., a form of communication). The information system creates information, which is communicated to the recipient, who is then influenced (or not) by the information. In this sense, information flows through a series of stages from its production through its use or consumption to its influence on individual and/or organizational performance. From this expanded view of IS success, it is not surprising to find that there are so many different measures of this success in literature, depending upon which aspect of IS the researcher has focused his or her attention.

For example Alloway (1980) developed 26 criteria for measuring the success of a data processing operation. The efficiency of hardware utilization was among Alloway’s systems success criteria. Other authors have developed multiple measures of systems quality. Hamilton and Chervany (1981) proposed data currency, response time, turnaround time, data accuracy, reliability,

completeness, system flexibility, and ease of use among others as part of a “formative evaluation” scheme to measure system quality.

DeLone and McLean (1992) have classified a lot of research under information quality. One example is Bailey and Pearson (1983) proposition of 39 system-related items for measuring user satisfaction. Among their most important items, in descending order were information accuracy, output timeliness, reliability, completeness, relevance, precision, and currency. Iivari and Koskela (1987) however, developed three information constructs : *informativeness*, which consist of relevance, comprehensiveness, recentness, accuracy and credibility; *accessibility* which consist of convenience, timeliness and interpretability; and finally *adaptability*.

The use of information system reports, is one of the most frequently reported measure of success of an information system (DeLone and McLean, 1992). Problems associated with this measure include ability to differentiate actual use (i.e. voluntary or discretionary use) from forced or captive use. Several authors have reported various kind of use, this raises another question that who is using the information system. However, user satisfaction is another IS success measure that has produced many interesting results.

When IS is highly required, then IS Use as measure of IS success becomes less useful; successful interaction by management with information system can be measured in terms of user satisfaction (DeLone and McLean, 1992). Several IS researcher have emphasized user satisfaction as success measure of their empirical IS research (Hamilton and Chervany, 1981, Guimaraes and Gupta, 1988, Igarria and Guimaraes, 1994). These researchers have found user satisfaction as especially appropriate when a specific information systems was involved. Igarria and Guimaraes (1994) tested the outcome of user involvement in DSS development. They concluded that “user involvement was found to have a strong impact on perceived DSS benefits and satisfaction”.

Individual impact and Organizational impact are probably more difficult to measure. One approach to the measurement of an information system is to ask user managers to estimate the value of the information systems. Udo and Guimaraes (1994) developed questionnaire items using more than ten similar literature sources, to empirically assess the factors related to DSS benefits from the user perspective. These source have different variables, that are considered potential factors affecting DSS benefits. Keen (1981) incorporated willingness to pay development costs for improved DSS capability in his proposed “Value Analysis” for justification of DSS. “Techniques such as value analysis, may

provide a more object framework, as well as be useful in accounting for the intangible benefits of DSS” (Udo and Guimaraes, 1994).

Various organizational performance measures for IS success that dealt with the influence of information systems were been used in many field study and case studies. DeLone and McLean (1992), noted that some researchers have suggested that the success of the MIS department is reflected in the extent to which the computer is applied to critical or major problem areas of the firm (e.g., Ein-Dor and Segve 1978). Guimaraes and Gupta (1988) for example measure the top management satisfaction with the MIS department. In a survey of several large companies, Rivard and Huff (1984) interviewed data processing executives and asked them to assess the cost reductions and company profits realized from specific user-developed application programs. Other measures of organizational impact include return on investment or return on management. Perry (1983) measured the extent to which an office information system contributed to meeting organizational goals.

DeLone and McLean (1992) concluded that there is not one measure of IS success but many. By studying the interaction along the component of IS success, the researcher gets a clearer picture as to what quality factors. Understanding of IS success factors is very important in analyzing the gap in this paper

4. THE THEORETICAL ANALYSIS

The gap this paper tries to clarify is the mismatch between those things specified by ISP stakeholders and the results of the final system. Usually the final system is somehow different from what was specified. As it was pointed out in chapter three that the final system quite often can be regarded as failure. This gap start from the ISP because ISP activities usually do not specify the quality requirements needed for the IS. As shown in the picture below (figure 3), IS pre-requirements flow from EMIS (an example of ISP framework) to prototyping (an example of software engineering developing process).

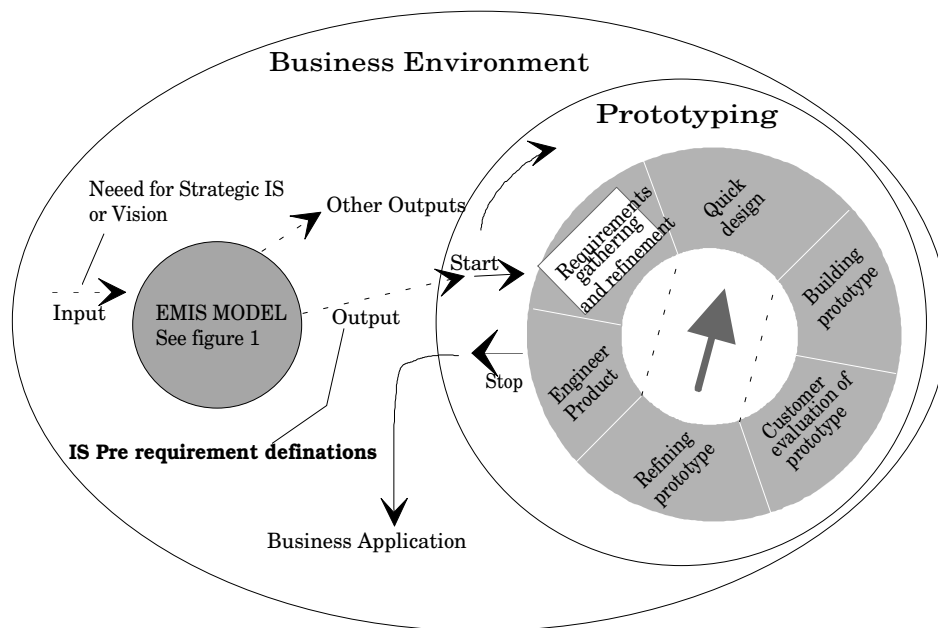


Figure 3. IS requirement flows as output from EMIS to Prototyping.

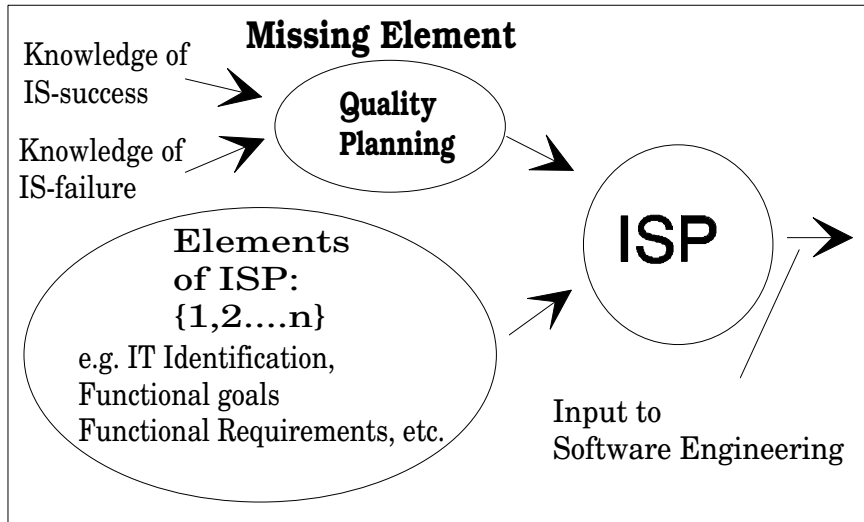
Meanwhile the software engineer relies on the specification from ISP to develop the final system, (see figure 3). Usually the result is that the system will be a failure because some of the required elements are missing. These failure results tell us that either something is wrong with the development process that delivers the final system or something is missing in the ISP specification. This paper is of the opinion that ISP do not specify all the necessary requirements at least the quality criteria. That is, even if the development process delivers the system according to the specification of ISP, the system will still fail, because of the missing quality criteria.

We turn to what makes the system successful. The body of literature on IS-success shows that most success criteria are quality issues (DeLone and McLean, 1992). These quality issues have been reviewed in chapter three. It was discovered in the analysis that ISP activities do not consider quality planning. I therefore propose that planning for quality during ISP activities might help in developing a successful system. The framework below shows how quality planning can improve IS-success.

4.2 The Pre/Post Analysis Framework.

This framework is intend to show that quality planning might serve as a bridge to the gap between the planned IS requirements and the delivered IS requirements.

In this framework it is assumed that quality issues can significantly increase the success rate of an IS. The framework also assume that other important elements of ISP remain constant and quality planning is the missing element.



There are two important inputs needed to carry out quality planning. One is the knowledge of IS-success and the other is the knowledge of IS failure. Knowledge of these two subjects is required because there are several reasons for IS-failure and several reasons for IS-success. This implies that there is a set of specific quality criteria appropriate for a particular system. Furthermore, the quality criteria for one system may be inappropriate for another system. Therefore the ISP stakeholders need to determine which quality criteria fit into the IS. Such quality selection will depend on the organizational settings, organization culture, and the IS practices in that organization. This is the reason why knowledge is a critical criterion for quality planning.

The other element for quality planning is knowledge of IS failure. There are several reasons for IS-failure as pointed out in chapter three, in some cases the reasons for IS-failure and IS-success may not be the same. Therefore, knowledge of IS-failure is also required to identify those things that might cause system failure if it is included in the system. For example user resistance can occur if some functions are included in the system. To identify those things that can cause failure, understanding of the organization and the system users are important.

A list of quality elements needed for the success of an IS will be developed as the result of quality planning. These elements will serve as a bridge between ISP and the final system. This is because when the final system is developed, the

system can be tested for those quality elements. It should be pointed out here that during the development process some of these quality elements might change, however the ISP stakeholders should redefine quality elements immediately. It is believed that if the quality elements are planned and developed there is a higher probability that the system will be a success.

5. CONCLUSION

This paper has considered quality planning as a bridge between ISP and the final IS. Quality planning requires two important elements, the knowledge of IS-failure and the knowledge of IS-success. The paper also pointed out that if these two issues are considered during ISP and implemented during the development process there is a high possibility that the final system will be successful. This theoretical framework is hoped to be tested as the next line of action in this research.

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ORGANISATIONAL PRACTICES FOR IMPLEMENTATION OF STRATEGIC INFORMATION SYSTEMS PLANS

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ABSTRACT

Strategic information systems planning (SISP) has gained considerable attention among reserchers and practising managers in recent years because of the large investments that organisations make in information technology, the many failures in such investments and the increasingly strategic nature of the impact of information systems on organisational performance. However, SISP struggles with serious problems. Specifically, lack of implementation of strategic information systems plans (SIS plans) is of considerable concern. It may seem to be a paradox that organisations develop SIS plans without implementing them.

This literature review identified a main theory of SISP and a range of organisational practices influencing implementation of SIS plans. The organisational practices are categorised into management factors, document factors, resource factors and user factors. While management monitoring to review implementation and provide feedback, management commitment and support for implementation, management actions to adopt plan and identify resources for implementation and management actions to avoid and dampen resistance to implementation are the key management factors; benefits documented in the plan, relevance of projects in the plan to organisational goals and management expectations, implementation analysis and migration documentation in the plan, comprehensiveness of content and sections of the plan and clarity and analysis of presentation of the plan are the key document factors; availability of IS specialists and project champions and availability of information technology needed are the key resource factors; and user education and training, user involvement in implementation, and avoidance of conflicts and resistance to adopt plan are the key user factors.

Based on the theory and the identified organisational practices influencing implementation of SIS plans, a potential model for implementation research is developed. Main constructs in this model are «Finished SIS plan», «Implemented SIS plan», «Implementation» and the four categories of organisational practices: «management», «document», «resources» and «users».

INTRODUCTION

Strategic information systems planning (SISP) has gained considerable attention among researchers and practising managers in recent years because of the large investments that organisations make in information technology (Earl and Feeny, 1994), the many failures in such investments (McFarlan and Nolan, 1995) and the increasingly strategic nature of the impact of information systems on organisational performance (Premkumar and King, 1994a). Although organisations use different approaches in their strategic information systems planning (Earl, 1993), SISP struggles with serious problems (Lederer and Sethi, 1992b). Galliers (1993, 1994b) found that strategic information systems planning is the most important IS management issue among key information systems issues. Premkumar and King (1994b) found that organisations spend significant amounts of resources on SISP and therefore are increasingly interested in determining if the benefits are commensurate with the investment.

Specifically, lack of implementation of strategic information systems plans is of considerable concern (Lederer and Salmela, forthcoming). Lederer and Sethi (1988) found that only 24% of the projects recommended in strategic information systems plans (SIS plans) in the 163 responding organisations in their survey were implemented.

It may seem to be a paradox that organisations develop SIS plans without implementing them. Failure to carry out SIS plans can cause lost opportunities, lack of priorities, duplicated efforts, incompatible systems, and wasted resources. Thus, the implementation of SIS plans to a greater extent than is currently the case seems to be a desirable outcome of improved strategic information systems planning (Lederer and Salmela, forthcoming).

In this paper, the literature on implementation of strategic information systems plans is reviewed. First, the literature on strategic information systems planning (SISP) is reviewed, including objectives of, approaches to, problems of and prescriptions for SISP. Second, a theory of strategic information systems

planning developed by Lederer and Salmela (forthcoming), is presented. Third, the literature on research findings related to implementation of SIS plans is discussed. Fourth, a research model for implementation study is developed based on the reviewed literature. Finally, conclusions from this literature review are presented.

STRATEGIC INFORMATION SYSTEMS PLANNING

Strategic information systems planning (SISP) refers to the process of identifying a portfolio of computer-based applications that will assist an organisation in executing its business plans and realising its business goals as well as identifying applications with a high impact and the ability to create an advantage over competitors (Lederer and Sethi, 1988). SISP includes all planning activities that are directed toward identifying opportunities for using IT to support the organisation's strategic business plans and to maintain an effective and efficient IS function (Premkumar and King, 1994b). In many organisations, SISP also includes the specification of databases and systems to support these applications as well as new applications with the potential to create advantage over competitors (Lederer and Salmela, forthcoming).

Strategic information systems planning is a critical planning area in most organisations (Earl, 1993):

«For many IS executives, strategic information systems planning (SISP) continues to be a critical issue. It is also reportedly the top IS concern of chief executives. At the same time, it is almost axiomatic that information systems management be based on SISP. Furthermore, as investments in information technology has been promoted to both support business strategy or create strategic options, an «industry» of SISP has grown as IT manufacturers and management consultants have developed methodologies and techniques. Thus SISP appears to be a rich and important activity for researchers.»

According to Lederer and Sethi (1988), the concept of strategic information systems planning evolved in the 1970s where the primary objectives were to improve communication with users, to increase top management support, to better forecast resource requirements and allocate resources, to determine more opportunities for improving the IT department, and to identify new and higher payback computer applications. According to Premkumar and King (1994b), the

conceptual foundation for strategic planning for information systems may be found in work by Zani (1970) who defined it as a top-down planning with emphasis on linking organisation business strategies to SISP. Later, researchers have questioned the traditional top-down approach and have suggested other SISP approaches as discussed below.

Today, objectives of SISP include improving IS performance, aligning IS with business needs, seeking competitive advantage from IS, gaining top management commitment, predicting future trends, increasing user satisfaction and improving IS functions, as listed in table 1.

Table 1. Objectives of Strategic Information Systems Planning (SISP).

<p>Improve IS performance (Premkumar and King, 1994a; Raghunathan and Raghunathan, 1994)</p>
<p>Align IS with business needs (Earl, 1993; Premkumar and King, 1994a)</p>
<p>Seek competitive advantage from IS (Ciborra, 1994; Lederer and Sethi, forthcoming)</p>
<p>Gain top management commitment (Earl, 1993; Raghunathan and Raghunathan, 1994)</p>
<p>Predict future trends (Lederer and Sethi, forthcoming; Raghunathan and Raghunathan, 1994)</p>
<p>Increase user satisfaction (Premkumar and King, 1994a; Lederer and Salmela, forthcoming)</p>
<p>Improve IS functions (Galliers, 1994b; Premkumar and King, 1994b)</p>

There are different approaches to SISP. Premkumar and King (1994b) found that in the last decade, the development of strategic information systems that provide competitive advantage has initiated a variety of process models and methodologies for planning based on Porter's value chain and competitive forced models. Earl (1993) distinguished between the following five SISP approaches: Business-Led, Method-Driven, Administrative, Technological and Organisational. While the Business-Led approach is based on the current business direction or plans, the Method-Driven approach requires use of a formal

technique or method such as Business Systems Planning (IBM), Information Engineering (James Martin) or Method/1 (Andersen Consulting), the Administrative approach emphasises resource planning, the Technological approach is based on the assumption that an information systems-oriented model of the business is a necessary outcome of SISP, and the Organisational approach is based on IS decisions being made through continuous integration between the IS function and the organisation.

Although there are different approaches to SISP, there is a fairly well established view of how organisations are conducting a strategic information systems planning process (Salmela, 1996). To carry out a SISP, an organisation usually selects an existing approach as discussed above, and then forms committees of users and IS specialists, and carries out a procedure of several steps, which usually takes several months (Lederer and Sethi, 1992a). The overall strategy and key choices made during the planning process are documented in the SIS plan together with resource requirements of planned applications and actions for realising the opportunities and meeting resource needs during implementation (Salmela, 1996). Lederer and Sethi (1992b) give the following description of the SISP process:

«To perform SISP, an organisation usually carries out a major, intensive study. The organisation follows one of several similar, well-defined, and documented methodologies to guide it, or it customises its own. It forms committees of users and information systems specialists. It often uses the methodology's vendor for training and guidance. During the multistep study, it defines a portfolio of applications, their priorities, databases, data elements, and a network of computers and communications equipment to support them. The study also provides a schedule for their development and installation.»

However, SISP has long been recognised as an intricate and complex activity replete with problems (Salmela, 1996). According to Lederer and Mendelow (1993), research has consistently found improved strategic information systems planning as the key issue facing IS executives. Lederer and Sethi (1992b) identified a total of forty-nine SISP problems, such as «failing to assess the current information systems applications portfolio, «failing to identify specific new projects», «failing to include financial, personnel and training plans», «failing to involve management and users», and «failing to execute the resulting SIS plan».

The last mentioned problem - «failing to execute the resulting SIS plan» - is the most interesting problem for this working paper. This problem and its causes will be discussed in the section on implementation of strategic information systems plans.

So far in this section, objectives of, approaches to and problems of SISP as described in the literature, has been discussed. Finally in this section, prescriptions for SISP are presented. Lederer and Sethi (forthcoming) conducted a study where the SISP experiences of 105 planners were identified. In their analysis, they identified prescriptions that were important for achievement of planning objectives such as those listed in table 1. They found that the five prescriptions in table 2 are the most important ones to achieve planning objectives.

Table 2. Key prescriptions for SISP according to Lederer and Sethi (forthcoming).

- 1 Prepare migration plan: The SISP study should prepare a plan for migrating to new applications including key projects and their order of implementation.
- 2 Get approximate requirements: The SISP study should converge quickly to a set of approximate organisational requirements rather than seek completely accurate and detailed ones.
- 3 Assess IT strengths and weaknesses: The SISP study should assess internal information technology strengths and weaknesses.
- 4 Consider management style: The SISP study should consider the organisation's management style.
- 5 Add value, reduce costs: The SISP study should focus on how information technology can add value, reduce costs, and create an advantage.

For this working paper on implementation, it is interesting to note that the most important prescription for SISP is related to implementation, i.e. that the SISP study should prepare a plan for migrating to new applications including key projects and their order of implementation.

As this review of literature on SISP documents, implementation is an important issue. First, among the seven objectives of SISP listed in table 1, only one of the objectives - «Predict future trends» - can be achieved without

implementation of plans. All the other objectives require implementation of SIS plans to be achieved. Second, all approaches to SISP are concerned with implementation (Earl, 1993). Third, among the key problems of SISP, scholars such as Premkumar and King (1994a, 1994b) and Lederer and Sethi (1988, 1992b) find that implementation is the main problem in strategic information systems planning. Generally speaking, change programs do not necessarily produce change (Beer, Eisenstat and Spector, 1990; Schaffer and Thomson, 1992; Schiemann, 1992; Van de Ven and Poole, 1995). Finally, the most important prescription for SISP is the planning of migration for implementation of SIS plans (Lederer and Sethi, forthcoming).

Before this paper reviews literature on implementation of SIS plans, a theory of SISP is presented to place the problems into a theoretical framework.

A THEORY OF STRATEGIC INFORMATION SYSTEMS PLANNING

Lederer and Salmela (forthcoming) have developed a theory of strategic information systems planning. The contribution of the theory is as a new means to help researchers study SISP and present their findings in an organised, comprehensive, parsimonious, and meaningful manner.

The theory consist of an input-process-output model, seven constructs, six causal relationships and six hypotheses as shown in figure 1.

The input-output-process model provides the initial bases for the theory. The seven constructs are 1) the external environment, 2) the internal environment, 3) planning resources, 4) the planning process, 5) the strategic information systems plan, 6) the implementation of the strategic information systems plan, and 7) the alignment of the strategic information systems plan with the organisation's business plan. These seven constructs exhibit causal relationships among each other illustrated through hypotheses. The relationships (i.e. the arrows in figure 1) represent the six hypotheses of the theory. Past research has not tested them explicitly and intentionally but has instead provided evidence to suggest them. They are written by Lederer and Salmela to be specific enough to guide and stimulate research yet still be general enough to facilitate variation in their interpretation and operationalisation. Lederer and Salmela (forthcoming) present the following overview of their theory:

« Strategic information systems planning has been described as a system comprised of inputs, processing and outputs. In that context, various inputs such as objectives, resources, and information influence a process of specific, predetermined, planning activities. The process results in an information plan (SIS plan) whose major component is a set of recommendations for new information systems.

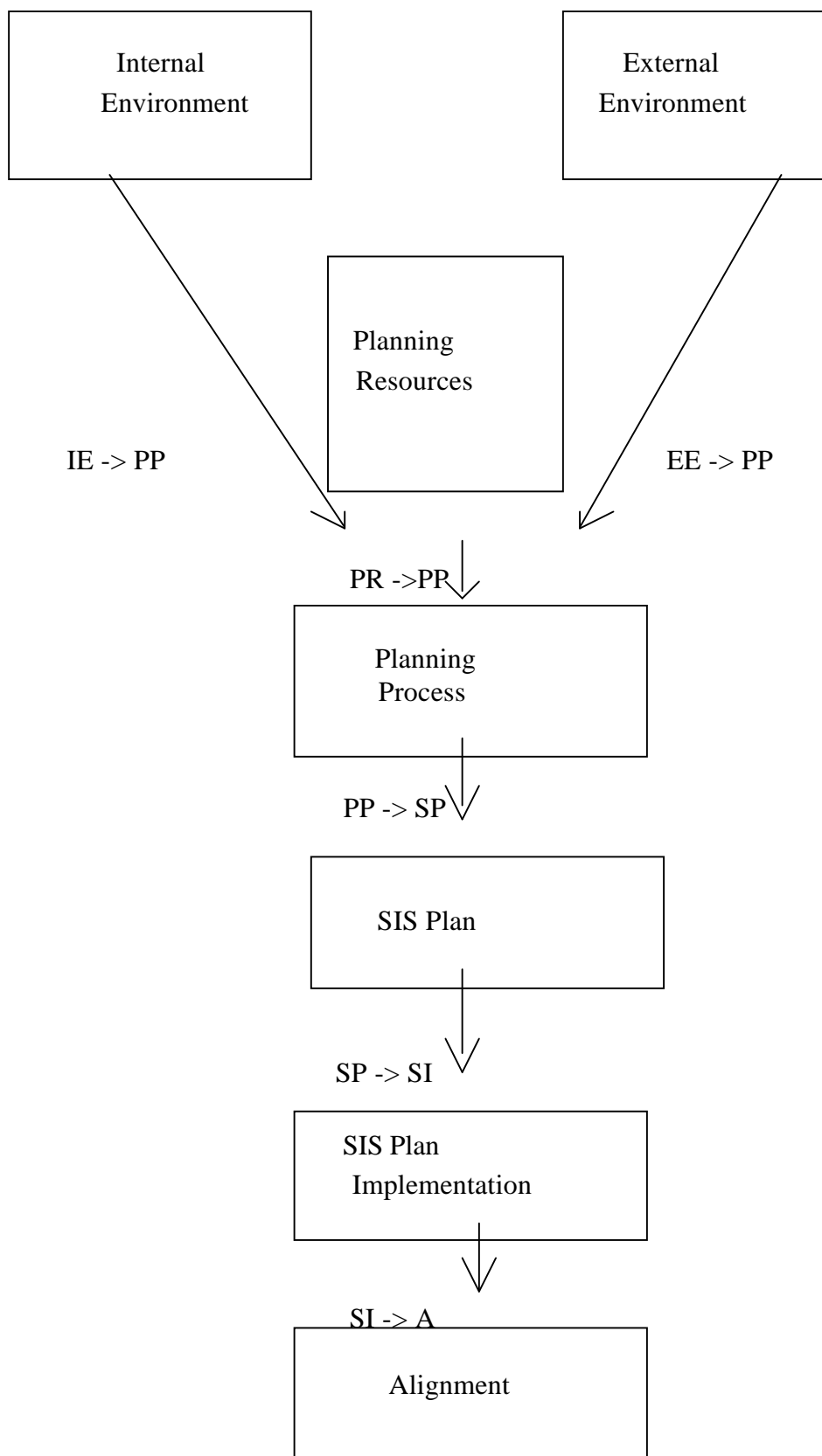
Elements both within the organization's internal environment and beyond its control influence the planning process. Hence we hypostatize both external and internal environments as constructs that affect the planning process.

However, organizations often fail to develop the systems in the information plan (SIS plan). Thus implementation of the plan is an important construct.

Finally, the objective of the implementation of the information systems plan is to effect the success of the organization. This is presumably done by aligning the results of the strategic information systems planning process - the implemented information systems - with the business needs of the organization. Thus alignment is an important construct. As a measure of successful strategic information systems planning, it is so important that it is the final dependent variable. In effect, the theory predicts alignment.»

Lederer and Salmela call their group of tenets a theory because there are units (seven constructs), laws of interaction (process and environment), boundaries (managers and professionals), system states (stages of progress), propositions (assumptions) empirical indicators (measures) and testable hypothesis. According to the debate by Sutton and Staw (1995) and Weick (1995a), a theory describes causal arguments for a small set of research ideas. While Sutton and Staw argue that references, data, lists of variables, diagrams and hypotheses are not theory.

Figure 1. A theory of SISP according to Lederer and Salmela (forthcoming).



Weick's answer is that such items certainly can be used to create theory (theorising). Lederer and Salmela (forthcoming), with their basic input-process-output model, seven constructs, six causal relationships with hypotheses, have certainly created theory which is useful in further research in the area of SISP.

For this working paper on implementation of SIS plans, the most important relationship in figure 1 is the effect of the SIS Plan on SIS Plan Implementation. In their discussion of this effect, Lederer and Salmela refer to research by scholars such as Earl (1993), Lederer and Gardiner (1992), Lederer and Mendelow (1993), Lederer and Sethi (1988), Premkumar and King (1994b), and Raghunathan and King (1988). Research by these scholars and other scholars on implementation of SIS plans is reviewed in the next section of this working paper.

The theory of strategic information systems planning presented in this section, is used in a later section proposing a potential research model on implementation of SIS plans.

IMPLEMENTATION OF STRATEGIC INFORMATION SYSTEMS PLANS

In this section, literature on research findings related to implementation of SIS plans will be reviewed. In general, implementation may be described as a series of steps taken by responsible organisational agents in planned change processes to install changes (Nutt, 1996). Specifically, implementation of SIS plans is the process of carrying out the planned changes such as developing and installing an architecture for required systems, developing the systems, applying data bases, installing communication systems as well as creating organisational changes and training users and management (Lederer and Salmela, forthcoming).

The literature on implementation problems for SIS plans is growing. In table 3, reviewed research on implementation of SIS plans is listed. For each study in the table, four characteristics were chosen to define the study: the research problem stated, implementation issues discussed, findings on implementation problems and the research methodology used. «Research problem» lists the main topic of each study which is not necessarily implementation. In fact, none of the identified studies listed in table 3 has as its main focus implementation of SIS plans. Those studies that represent research on implementation, are primarily concerned with either the implementation of planning such as SISP or the

implementation of IT directly without mentioning plans. Those studies discussing planning, are only secondarily concerned with implementation of the SIS plan. «Implementation issue» lists the implementation related subject discussed in each study. «Implementation finding» lists main implementation related issues in each study. «Research methodology» lists research technique used in each study.

It is important to note that the analysis in table 3 is limited to the main problem in column «Research Problem», as well as the main implementation issue and finding in the columns «Implementation Issue» and «Implementation Finding». Furthermore, table 3 lists research from a broad field, including not only SIS plan implementation but also IS implementation research which are marked with an asterisk (*) in the table. This is done to provide a broad initial perspective on implementation issues. Later on in this paper, only research focused on SIS plans and their implementation, will be subject to further description and discussion.

Table 3. Comparison of research studies on implementation.

Study	Research Problem	Implementation Issue	Implementation Finding	Research Methodology
Boynton, Zmud, and Jacobs (1994)*	IT use in large organisations	IT management practice	Managerial IT knowledge	Sample survey
Clemons, Thatcher and Row (1995)*	Reengineering failures	Functionality and political risks	Strategies-in-use over strategy espoused	Case studies
Earl (1993)	IS planning performance	Planning method performance	Management involvement	Case studies
Galliers (1994a)	Strategic IS planning	Guidelines for successful implementation	Difficulty of recruiting	Sample survey

Galliers, Pattison and Reponen (1994)	IS planning performance	Executive workshops	Project champion	Case studies
Gill (1995)*	Expert systems implementa- tion	Systems abandoned and improved	Managerial competence	Field studies
Joshi (1991)*	IT implementa- tion	Users´ resistance to change	Process to assess change	Proposed theory
Lederer and Mendelow (1993)	IS planning performance	Shifting priorities over time	Duration of systems development	Field study
Lederer and Salmela (forthcoming)	Theory of SISP	Effect of plan on implementa- tion	More useful plan	Proposed theory
Lederer and Sethi (1992b)	IS planning implementa- tion	Root causes of implementa- tion problems	Commitment for implementa- tion	Sample survey
Lederer and Sethi (forthcoming)	Prescriptions for SISP	Planning completion	Plan fit to organisation	Sample survey
Levine and Rossmore (1993)*	IT implementa- tion	Human threats	Politics of implementa- tion	Case study
Premkumar and King (1994a)	IS planning performance	Quality of implementa- tion mechanisms	Organisational characteristics	Sample survey

Raghunathan and Raghunathan (1994)	IS planning model	Fulfilment of planning objectives	Enhancing management development	Sample survey
Remenyi (1990)*	Management practice of SIS	Implementation of Strategic Information Systems	User involvement	Cases (and Survey)
Salmela (1996)	IS planning in turbulent environment	Planning methodology	SISP better than emergent ISP	Sample survey
Sviokla (1996)*	IT implementation	Success in implementation	Manage momentum of project	Case studies
Teo (1994)	Business and IS planning integration	Factors for implementation problems	Management commitment	Sample survey

Column four «Implementation findings» is the most interesting one in table 3, listing as most important determinants for implementation such organisational practices as: managerial IT knowledge, gap between strategies-in-use and strategy espoused, management involvement, recruiting qualified IT personnel, identifying project champion in the organisation, managerial competence, process to assess change, duration of systems development, usefulness of plan document, commitment for implementation, fitness of plan to organisation, politics of implementation, organisational characteristics, management development, user involvement, planning approach and management commitment.

As discussed above, some of the studies in the literature are not explicitly focusing on SISP. These studies marked with an asterisk (*) in tables 3 and 4, are excluded from further review (Boynton, Zmud, and Jacobs, 1994; Clemons, Thatcher and Row, 1995; Gill, 1995; Joshi, 1991; Levine and Rossmore, 1993; Remenyi, 1990). Furthermore, some of the SISP studies only marginally treat issues related to SIS plan implementation. These studies are also excluded from

further review (Galliers, Pattison and Reponen, 1994; Lederer and Mendelow, 1993; Raghunathan and Raghunathan, 1994; Salmela, 1996; Teo, 1994).

Hence, six studies out of the original eighteen studies are remaining for further analysis. Since this literature review is concerned with the implementation of SIS plans, organisational practices influencing implementation are of key importance in this working paper. From the six remaining research studies, organisational practices influencing implementation are identified and listed in table 5.

Table 5. Organisational practices influencing implementation of SIS plans.

<p><u>Earl (1993): Implementation Problems</u></p> <p>E1 Resources were not made available E2 Management was hesitant E3 Technological constraints arose E4 Organisational resistance emerged</p>
<p><u>Galliers (1994a): Implementation Barriers</u></p> <p>G1 Difficulty of recruiting G2 Nature of business G3 Measuring benefits G4 User education resources G5 Existing IT investments G6 Political conflicts G7 Middle management attitudes G8 Senior management attitudes G9 Telecommunications issues G10 Technology lagging behind needs G11 Doubts about benefits</p>
<p><u>Lederer and Salmela (forthcoming): Effect of Plan on Implementation</u></p> <p>S1 Contents of the plan S2 Relevance of proposed projects in the plan to organisation goals S3 Sections of the plan S4 Clarity and analysis of presentation of the plan</p>

Lederer and Sethi (1992b): Implementation Problems

- L1 Difficult to secure top management commitment
- L2 Final planning output document not very useful
- L3 Planning methodology fails to consider implementation
- L4 Implementing the projects requires more analysis
- L5 Planning methodology requires too much top management involvement
- L6 Output of planning is not in accordance with management expectations

Lederer and Sethi (forthcoming): Prescriptions for SISP

- X1 Prepare migration plan
- X2 Identify actions to adopt plan
- X3 Identify resources for new tools
- X4 Avoid/dampen resistance
- X5 Specify actions for architecture
- X6 Identify bases of resistance

Premkumar and King (1994a): Implementation Mechanisms

- P1 Monitoring system to review implementation and provide feedback
- P2 Resource mobilisation for implementation
- P3 User involvement in implementation
- P4 Top management monitoring of implementation

The thirty-five organisational practices from the six research studies listed in table 5 enable a derivation of comprehensive but parsimonious organisational practices for implementation of SIS plans. According to Lederer and Sethi (forthcoming), doing so requires considering the item specificity or granularity of each factor. Item specificity refers to the level of abstractness of a factor. As Lederer and Sethi (forthcoming) did in their study on prescriptions, the derivation in this working paper chooses the more specific or precise factor because it describes a more concrete influencing factor on SIS plan implementation. For example, instead of the general factor «final planning output document not very useful» (Lederer and Sethi, 1992b), this working paper uses specific document

organisational practices such as «Benefits documented in the plan» (Galliers, 1994a), «comprehensiveness of content and sections of the plan» (Lederer and Salmela, forthcoming) and «clarity and analysis of presentation of the plan» (Lederer and Salmela, forthcoming). This also helps ensure that the organisational practices have comparable granularity. According to Lederer and Sethi (forthcoming), the derivation also requires that the organisational practices represent all aspects of SIS plan implementation and thus sample its entire domain. This is accomplished in this working paper by explicitly confirming that the main research literature on this subject has been reviewed (table 3), and that the six most important research studies are basis for the factors (table 5). Table 6 lists the SIS plan implementation factors derived from this literature based on table 5. The preliminary organisational practices in table 5 have been collated, summarised, paraphrased and neutralised in their meaning in table 6. Also, the organisational practices have been categorised into the following four categories: management factors, plan document factors, factors representing resource availability and factors related to users of new infrastructure, architecture and information systems. The four categories were chosen since each of the six research studies discuss factors belonging to most of these categories. The general interpretation of the fourteen organisational practices in table 6 is that the extent of these organisational practices will positively influence the extent of SIS plan implementation. For example, an increase in the extent of «management monitoring to review implementation and provide feedback» will cause an increase in the extent of SIS plan implementation.

The organisational practices listed in table 6 may all be defined as organisational factors in a broad sense. It may seem surprising that no environmental factors are listed in the table. However, past research indicates that organisational factors are much more important than environmental factors. Teo (1994, page 158) distinguished between organisational and environmental characteristics when studying integration between business strategy and SISP. He found that organisational characteristics are better predictors of the extent of integration than environmental characteristics. Similarly, Salmela (1996, page 177) made a distinction between organisational and environmental factors when studying SISP in turbulent environments. He found that plan implementation is less effected by unpredicted changes in the external environment than by unpredicted internal changes. A possible interpretation of Teo's (1994) and Salmela's (1996) research findings is that environmental factors only indirectly influence SIS plan implementation through organisational factors.

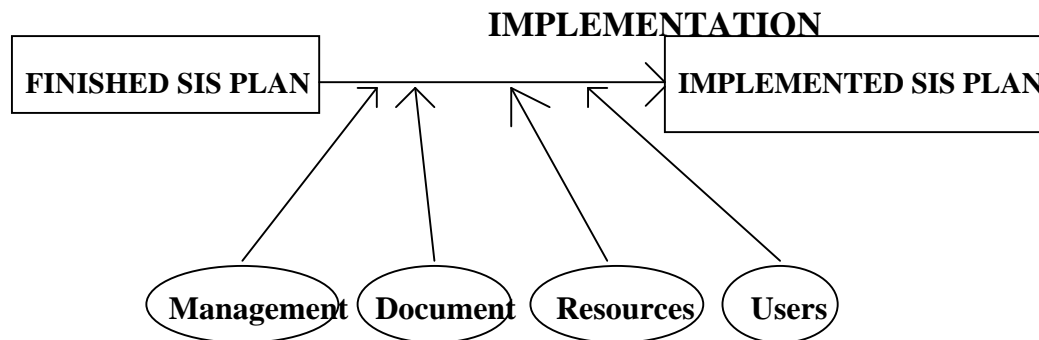
Table 6. Categorized organisational practices influencing implementation of SIS plans.

<p><u>Management</u></p> <p>1 Management monitoring to review implementation and provide feedback (Premkumar and King, 1994a)</p> <p>2 Management commitment and support for implementation (Earl, 1993; Galliers, 1994a; Lederer and Sethi, 1992b)</p> <p>3 Management actions to adopt plan and identify resources for implementation (Lederer and Sethi, forthcoming)</p> <p>4 Management actions to avoid and dampen resistance to implementation (Lederer and Sethi, forthcoming)</p> <p><u>Document</u></p> <p>5 Benefits documented in the plan (Galliers, 1994a; Lederer and Sethi, 1992b)</p> <p>6 Relevance of projects in the plan to organisational goals and management expectations (Galliers, 1994a; Lederer and Sethi, 1992b)</p> <p>7 Implementation analysis and migration documentation in the plan (Lederer and Sethi, 1992b; Lederer and Sethi, forthcoming)</p> <p>8 Comprehensiveness of content and sections of the plan (Lederer and Salmela, forthcoming; Lederer and Sethi, 1992b)</p> <p>9 Clarity and analysis of presentation of the plan (Lederer and Salmela, forthcoming; Lederer and Sethi, 1992b)</p> <p><u>Resources</u></p> <p>10 Availability of IS specialists and project champions (Earl, 1993; Galliers, 1994a; Premkumar and King, 1994a)</p> <p>11 Availability of information technology needed (Earl, 1993; Galliers, 1994a; Premkumar and King, 1994a)</p> <p><u>Users</u></p> <p>12 User education and training (Galliers, 1994a)</p> <p>13 User involvement in implementation (Premkumar and King, 1994a)</p> <p>14 Avoidance of conflicts and resistance to adopt plan (Earl, 1993; Galliers, 1994a)</p>
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TOWARD A MODEL FOR IMPLEMENTATION RESEARCH

In the previous sections, the literature on implementation of strategic information systems plans was reviewed, and a theory of SISP by Lederer and Salmela (forthcoming) was presented. In this section of the working paper, one major causal link in Lederer and Salmela's theory will be explored using the identified fourteen organisational practices influencing SIS plan implementation. The link is between «Finished SIS Plan» and «Implemented SIS Plan» as shown in figure 2.

Figure 2. A potential model for research on SIS plan implementation.



A «Finished SIS plan» is characterised by a document which is the result of a planning process including the decision to carry out the plan. An «Implemented SIS plan» is characterised by implemented systems which are the result of an implementation process including development and installation of infrastructure, databases, and management and user education and training. «Implementation» is the construct representing the shift from «Finished SIS plan» to «Implemented SIS Plan». This shift is influenced by fourteen organisational practices as listed in table 6, and these organisational practices are categorised into management, document, resources and users as shown in figure 2. There are assumed causal relationships between the organisational practices in these categories and implementation.

CONCLUSIONS

Implementation of strategic information systems plans (SIS plans) is an important issue in organisations today. Implementation of SIS plans seems to struggle with fundamental problems. The problems may be interpreted as being organisational practices that, when considered and solved properly, will increase the extent of implementation. From the main literature (Earl, 1993; Galliers, 1994a; Lederer and Salmela, forthcoming, Lederer and Sethi, 1992b; Lederer and Sethi, forthcoming; Premkumar and King, 1994b), fourteen organisational practices influencing implementation of SIS plans were identified.

In a search for the most important factor for implementation of SIS plans, the reviewed literature is unable to provide an answer. While Earl (1993) found evidence from interviews that «typically resources were not made available, management was hesitant, technological constraints arose, or organisational resistance emerged», Galliers (1994a) ranked explicitly «difficulty of recruiting» in the first place among implementation barriers, Lederer and Salmela (forthcoming) focused on the contents and the comprehensiveness of the plan, Lederer and Sethi (1992b) ranked explicitly «secure top management commitment for implementing the plan» as the most important factor, Lederer and Sethi (forthcoming) developed «prepare migration plan» as the most important prescription and Premkumar and King (1994a) found that the most important implementation mechanism is «monitoring system to review implementation and provide feedback».

Instead of identifying the most important factor for implementation SIS plans, this working paper first identified thirty-five organisational practices from the main literature and thereafter through derivation developed fourteen organisational practices in four categories. Among the four categories, it is difficult to conclude on one single category being the most important one for implementation. However, the literature reviewed gives a strong indication that: management factors are the most important once for implementation of SIS plans.

This working paper has revealed a need for explicit research into implementation of SIS plans. Most of the reviewed literature apply a broader perspective of SISP, treating implementation as one of many phases and leaving issues such as «what is really meant by implementation» quit unclear. Hence, this working paper suggests a model for implementation research which, when developed, can be applied to find the most important organisational factor(s) influencing implementation of SIS plans.

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RUSSIAN TRADE AND INFORMATION
RESOURCES MANAGEMENT;
A CASE OF A FINNISH CONGLOMERATE

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Abstract

The objective of this research is to study to what extent strategic thinking, especially frameworks of information technology (IT) strategies and organizational communication, created in western industrialized countries could be applied in trade transactions in technologically less developed countries. The application here involves the trade between Finland and Russia, and is mainly concerned with information resources management (IRM), i.e., how firms acquire their strategic business information, and how they use it. In order to reach this objective empirical studies have been conducted in a large Finnish conglomerate on implementation of its IRM.

The research is based on two theoretical approaches: (I) information resources management and (ii) organizational communication

The methodological approach in the presentation emphasizes soft qualitative, interpretive orientation towards the research problem. A multiple view is used to analyze the aspects of human activities, information requirements, social and cultural environment as well as technological matters concerning IRM.

The empirical studies imply that the western frameworks used in the study can be used to assess and analyze the various aspects of information resources management, but what comes to applying them into formulation of IT strategies they fail to do that, yet. Therefore, those frameworks have to be renewed and reframed in order to fit the special Russian transition environment and infrastructure.

1. Introduction

Up to the recent years, the Eastern trade of Finnish companies was conducted with Soviet trade organizations. In that trade, basic broad lines were dealt with on an inter-governmental level. After the collapse of the Soviet Union, the Finnish firms face new kind of challenges in dealing with their Eastern counterparts. In the new situation, three sets of trends have to be taken into account: (i) social and cultural turbulence with rising expectations of the people, (ii) the slowly advancing transition from the planned to market economy, and (iii) the transformation of the military technology into civilian use. Recent political, social and economic turmoil following the era of stagnation has driven Russia's business environment and institutions from the strict hierarchy into a state approaching market-like conditions. Modern market capitalism, although sought as a goal, is still possibly decades away in the future. The Russians are, however, trying to build a market economy system from a scratch, a task that took centuries to perform in the Western world (Yergin & Gustafson, 1993).

The Russian trade as a research topic is both interesting and important for the foreign trade of Finland - and the European Union (EU) as well. After becoming a member of the EU, Finland is the only one of its members to have a land boarder with Russia. This puts Finland into a special gateway position, which is emphasized through the traditionally good and long trade relations between Finland and Russia as well.

The trade between Finnish companies and the late Soviet Union and its allies is slowly recovering. At the peak level, in early 1980's, the Soviet trade represented more than 20% of the Finnish foreign trade. After the total collapse in 1991, it has slowly advanced again, being now about 7%. At the same time, international competition in the arena has increased through upheaval of trade restrictions. The world-wide recession has forced also other highly industrialized nations to establish themselves into these markets. Information technology (IT) might be a competitive weapon for the companies in increasing their market share in the area in the future.

The overall change in the world business environment at the same time is a very radical one, arising from three phenomena: Networking of organizations and their information systems, increasing utilization of market mechanisms in mutual transactions, and a global emphasis on business operations. Organizational structures of enterprises grow flatter and barriers between them lower. Operators in the international market often perform occasional one time transactions through electronic devices with their business partners.

Information Resources Management (IRM) become vital means for business transactions, while products and communication have become "informed" (Zuboff, 1988). The western industrialized countries are in the state of a transition from mere manufacturing towards more information and service intensive business, where information and its processing become an ever more essential part of everyday work. This will also be happening in the Eastern block, possibly in the quite near future. However, intuitively seen, the transition process - the advance from socialist system into market economy - may take a considerably longer time in Russia and the rest the CIS (Commonwealth of Independent States - the late Soviet Union, except the Baltic states) than in the Eastern Central European or the Baltic Countries which have shown signs of a very rapid development.

This development calls for fresh forms of coordination in order to create feasible conditions for buyers and sellers to meet and effectively perform their trading activities. Electronic communication plays a very essential role in the realization of this process. This is true also in foreign trade and especially in the Eastern market where technical possibilities are scarce and less advanced, or at least their supply is unstructured and very costly. However, IT gives a powerful tool for making it possible.

The empirical study presented here involves a Finnish conglomerate active in the Russian trade. Through mapping the use of information resources (IRM) and communication within the firm some guideline thesis to benefit all the parties involved have been formulated through three case studies. These guidelines constitute a foundation for an advanced study, where further cases are written in order to understand how the guidelines fit for explaining the trends in the trade. However, the study also produces a number of new questions that have to be attended to in the future.

2. Basic Outline of the Research Problem

The main research problems are to find out:

1. *To what extent are strategic information systems formulation frameworks developed for “Western countries” applicable in the Russian context?*
2. *What kind of special features and constraints of the Russian environment have to be taken into account when trying to apply Western style of management practices there?*

The empirical data maps concrete experiences of a company acquiring and utilizing its own information and also information gathered by others: Other divisions of the firm; other companies; or governmental and public administration institutions. The foci for the empirical study are set followingly:

- Geographically the area of the study is the enterprise’s Russian activities.
- Main reference of the study are the activities of the enterprise performed through its Russian subsidiaries.

3. Theoretical background

The research is based on two theoretical approaches: (i) information resources management and (ii) organizational communication.

Information Resources Management

In the 1980’s, several authors (e.g., McFarlan, 1984; Porter & Millar, 1985; Synnott, 1987; Wiseman, 1985) praised IT to be the ultimate weapon to create sustained competitive advantage in the constantly toughening competition. Later on, there have been doubts concerning this thought, and today many business managers regard IT as a commodity, as one of the non-core resources (like law, accounting and such), a “hygiene” resource, that you can outsource, but you can not do without (Lacity & Hirschheim, 1995) Still, Lacity & Hirschheim (1995) argue that IS is different, it cannot be treated as any other function, it is more valuable, and in some cases it really makes the difference. In the more and more networking organizations, IT is the “thing” that holds the network together (see e.g. Jarvenpaa & Ives, 1994; or Rockart & Short, 1991).

Starting from the point of view that IT really is a strategic resource, Earl (1989) claims that IT strategies are not constant, but they vary over time and

context. Several frameworks have been introduced claiming to give superior competitive advantage through IT. Those frameworks are usually called strategic information systems planning (SISP) methods or techniques. A good review of such can be found, for example, in Remenyi (1991). However, for example, Mintzberg (1994) and Earl (1996) say that formal planning techniques fail to produce competitive advantage. Therefore, in this study, I have concentrated on specific features in three models, which are illustrated in the appendices of this paper. The choice of these three I base on my intuition of them to be: 1) More mental frames - of the attributes to be taken into account when framing strategic choices - than techniques; 2) Discussing all the relevant aspects of strategy development. These three models include: (i) The EMIS processual model; (see Exhibit I) (ii) The MIT90's framework (Scott Morton, 1991, see Exhibit II) ; and (iii) Expanded contingency relationship for intra-corporate transactions (King & Sethi, 1992, see Exhibit III). The theoretical foundations of all of them are discussed in some detail here below.

The EMIS processual model, created at the Institute of Information Systems Science of the Turku School of Economics and Business Administration, involves the following strategic agendas (Reponen, 1987, 1993b):

- connections of IT in the enterprise's business strategy
- the critical success factors of information processing
- the objectives of the strategic use of IT
- principles of IT management
- preliminary description of IS architecture (information, applications, device, communications)
- resources for strategy implementation

The model divides the strategy process into the following phases:

- organization of the design process
- mapping of the enterprise's business strategy
- mapping of the present state of information processing
- the design process
- formulation of the IS strategy (IRM)

The model is flexible and can be applied to fit for strategy development individually in different organizations. It emphasizes the procedural nature of information resources management strategy formulation. (Reponen, 1994) The model has been successfully implemented in various studies, usually applying action research (see e.g., Reponen, 1993c and 1994; or Salmela, 1990). In

maintaining IS strategies this procedural nature gives a chance for constant monitoring of the strategies.

The MIT's Organization of the 1990's (Scott Morton, 1991) model creates tools for analyzing the state of the company's IT involvement through mirroring it against the company's internal and external attributes. A major challenge for management in the 1990's will be to lead their organizations through the transformation necessary to prosper in the globally competitive environment. An organization can be thought of comprising five sets of forces dynamically interacting among each other while the organization is dealing with forces from its environment. These five forces include: strategy, management processes, technology, structure, and individuals & roles. They are conceptualized in the framework, and can be treated as building blocks of general management activities. Each of them can be separately used for examining the major implications of IT exploitation.

Transnational Systems (TNS), information systems and technology in use by transnational actors in the support of transnational interactions, include (King & Sethi, 1992 p. 219):

- global financial systems that interconnect all subsidiaries;
- Management issues in setting up such systems;
- Processes involved in and developing subsidiary IS operations;
- Subsidiary IS operations.

The domain and environment of an TNS include (King & Sethi, 1992 p. 224): (i) Intracorporate transactions - concerning organizational, architectural and personnel linkages pertaining to IS function only - and also pertaining to the support function of IS; (ii) Transactions with an inter-government body - technical and regulatory issues; (iii) Host government transactions - political, economic, technological and socio-cultural issues; (iv) reactive - national information policies' impact on the transnational interactions of the firm; (v) TNS environment - bilateral, regional and multilateral agreements.

The interface between the corporate unit and its overseas subsidiaries is provided by intra-corporate transactions. The primary function of this interface's is to (King & Sethi, 1992 p. 225):

- Organize subsidiary operations such that they are in congruence with the operations of the parent;
- Render more effective corporate planning and the deployment of IS and personnel, while maintaining sensitivity to local characteristics of the subsidiaries;

- Integrate subsidiary operations into corporate “architectures” to attain efficiencies.

Organizational Communication

The problems of communication in organizations have already been researched for along time. Concepts concerning the communication climate have been available since Taylor and the work of his descendants of the scientific management school, through the school of human relations up to contingency theory (cf., e.g., Morgan, 1989; Goldhaber, 1985; Rogers et. al, 1975). Communication as a phenomenon is very complicated and contains many problems (Cf. Kangas, 1995).

There are to basic models of communication: 1) The conduit model (Shannon & Weaver, see e.g., Berlo, 1960) which is based on paradigmatic mode of cognition, with assumptions of underlying objective knowledge, words with fixed meaning, universality of understanding and systematic application of logic; 2) The language games model (see e.g., Wittgenstein, 1981) which is based on narrative mode of cognition, with objectivity ratified by a specific community’s interpretive conventions, words with consensus of meaning defined by a specific community, language as thought and knowledge, the world described only through language and narratives, and knowledge formations through the invention of new language and narrative forms. Boland & Tenkasi, 1995)

Boland and Tenkasi (1995) prescribe to using the conduit model in situations where the community’s perspective is strong and well developed. In other situations, especially when perspectives are just rising and changing, the conduit model is not working well. In those situations the language game might behave better.

Electronic communication improves the competitiveness of a nation and reduces significantly the physical transportation of people and goods. It is thus a reasonable solution ecologically as well. There are all the possibilities to utilize it effectively, but the lack public infrastructure creates problems in Russia. However, the fact is that, in the long, run those who can best utilize the possibilities of new technology will be the most successful, and those businesses that let themselves fall behind technologically will suffer dire consequences (Cunningham & Tynan, 1993). Therefore, the technological services must be bundled along with other services to create critical resources that competitive advantage. An optimum configuration of the firms resources creates superior performance (Mehra, 1996)

Organizations typically operate in a relational context of environmental interconnectedness and their survival and performance often depends critically upon their linkages to other organizations. Inter-Organizational Relationships (IOR) in the form of collaboration (strategic alliances [Ohmae, 1989]) become an increasingly relevant means for operations. In this study such relationships are discussed as intra-organizational, because divisions of large conglomerates can often be regarded as enterprises within an enterprise. This is important especially in the Russian involvement where new coalitions within firms are essential. These relationships play a crucial part in future business strategies. Therefore a study of these linkages is vital especially in a research of such market environment as in Russia in order to explain the strategy modes most effective and feasible for the activities (Kangas, 1994). Little attempt has been made in literature on interorganizational relationships to integrate them into generalizable predictors of relationship formation or to distinguish between what causes such relationships or the conditions under which such relationships occur (Oliver, 1990). Collaboration and a shared vision present an effective and efficient means for strategic concern of IT issues in the future in any market (Kangas, 1994).

Foreign subsidiaries are often knowledge-intensive, because they represent a community of specialized expertise. Therefore, their organizational chart is often lateral rather than hierarchical (Cf. Boland & Tenkasi, 1995). The lateral organization relies on peer-to-peer collaboration in achieving organizational objectives. In the creation a communication system in that kind of environment one has to emphasize reflexivity and transfer of knowledge. From the point of view of the conduit model one can deduce that the information stored in computers is in the form of data, and as such only the raw material to be processed into information and knowledge through using programs embedded in information systems. From the organizational knowledge point of view Nonaka (1994) sees this kind of input-process-output sequences of hierarchical information processing insufficient. According to him, an organization should not only solve existing problems, but also innovatively create and define new problems and then actively create new knowledge to solve them. This requires the distinction between tacit knowledge (the unexplainable and unformalized know-how to do something, which only exists in the mind of the doer) and explicit knowledge (formalized data, that can be gathered into different storages).

4. The Firm, the Objective of the Empirical Study

The Firm, a Finnish conglomerate, is a hierarchically managed multidivisional corporation (M-form, e.g., Williamson, 1971) with traces of a matrix form (See e.g., Morgan 1989) and the entrepreneurial firm (Bartlett & Goshal, 1993). The Firm has a diversity of activities in numerous countries. However, without revealing the identity of The Firm, it can be said that the products and services of its different divisions concentrate on similar raw materials, although divisional value chains (Porter, 1985) differ. The discussion here concentrates, however, on its operations in one specific foreign country, Russia. A more thorough description of this involvement is reported in my recent study (Kangas, 1996a). The organization of The Firm involves:

- Divisions of a high grade of independence, with their own divisional strategies and specialized information systems covering their transactions often worldwide.
- A corporate organization of top management with attending to corporate issues as an umbrella, and different kinds of support and service units. The corporate information systems provide common systems, for example, for accounting, corporate databases and such, as well as the corporate network architecture for connecting the various individual systems inside the corporation into a network of knowledge nodes. (Cf. Jarvenpaa and Ives, 1994)
- Different kinds of temporary organizations and taskforces - loosely coupled networks (Orton & Weick, 1990) - with temporary and often virtual information systems just built for one special purpose.

The activities in Russia of The Firm involve about 20-25 people (cooks, cleaners and drivers included). The activities are mainly located in Moscow, although there are some, more or less temporary, offices, in St. Petersburg (2-3 people) and in some other locations in North-Western Russia. The Russian staff consists of the corporate Moscow representative office, totally about 10 persons, and of two business unit profit centers, divisional trading offices, one of 7 people and the other one of 2-3 people. The representative office has two functions. On the one hand it is a service unit, taking care of different running matters (visas, permits, traveling arrangements, local accounting and such). On the other hand it is the legal embodiment of The Firm's presence in Russia, that is to say it is the only legal organization to deal with the Russian outworld. Thus, the head of the representative office is the only local person able to sign, for example, contracts with the Russian counterparts. However, the divisional offices have complete autonomy what comes to conducting their business transactions. Their business is

formally managed from the respective divisional headquarters in Finland, and the contracts they deal with are signed between their divisional headquarters in Finland and the Russian party.

The formal local organizational chart seems at first glance quite clear. The head of the representative office is a corporate vice president who reports to the corporate vice chief executive officer. The assistant head of the representative office and the office staff, as well as the heads of the local profit centers report to the head of the representative office. However, in practice, with regard to the profit centers, these reporting obligations of the profit centers concern only minor administrative matters. What comes to business matters of the profit centers, the obligations are practically nonexistent. Their chiefs report directly to their respective divisional top management. Also different task forces and other contemporary travelers to Russia are obliged to report to the head of the representative office, but most often they fail to do so.

5. Methods and guidelines for empirical study

In the object environment of Russia one can state that any research for future recommendations in Russian activities of an enterprise can only give educated guesses about competitive edge and success factors. The new socio-cultural order and the business environment are at an immature state of development, and the future political stance remains to be seen. In this turbulent, fuzzy and completely new setting the only possible approach for this kind of pioneering study is idiographic. No nomothetic methodology will do in an emergent situation. The methodological approach in the presentation will emphasize soft qualitative, interpretive (Klein & Myers, 1996) orientation towards the research problem. A multiple view is used to analyze the aspects of human activities, information requirements, social and cultural environment as well as technological matters concerning IRM.

The Conceptual Phase

The preliminary phase of the study has been the acquisition of a mental model of the area of application. This has involved literature studies and discussions with experts as well as formulating a list of open-ended questions. The models and the questions list comply with the formulations in the EMIS-model (Cf. Exhibit I), where emphasis is set on following aspects:

- Internal matters such as visions, knowledge, practical experience and state of the art technology inside the organization.
- External matters such as overall concepts, technological innovations, outside experience and theoretical knowledge.

The mental model thus accomplished has provided a preliminary frame of reference for the study.

The Case Study

The second phase has involved in-depth interviews and observations in The Firm, mainly in its Moscow office, in order to conceive a local view of the situation. All the gathering of the empirical data has happened between December 1994 and July 1995. There has been three 2-week visits to Moscow. In Moscow, the interviews have involved the representative office staff, the divisional representatives and occasional project staff there. Besides the interviews, also the activities of the office and its employees have been observed as well as the use of computers, electronic communication devices and - other - non-electronic information devices. The conceptions, thus acquired, have been supplemented and reinforced in the company headquarters through interviewing representatives of divisions, strategy units, project management and IS management, as well as through company documents. The concept of IT has been dealt here in a wider sense, encompassing also non-electronic information (cf., e.g. Reponen 1993a).

The main source of empirical data are semi-structured interviews. They were conducted with applying an interview form which included the following groups of questions:

1. Job description of the interviewee, its correspondence to the official job description.
2. The connection of the interviewee to the Russian activities, communication concerning them, and the interviewee's conception of the overall communication climate in The Firm.
3. The interviewee's acquisition of information concerning Russia, its storing and its sharing with others.
4. The interviewee's conception of the coordination of the operations and cooperation connected to the Russian trade.
5. The IT devices the interviewee had access to, the interviewee's conception of the level of managing these devices. The interviewee's personal conception of the significance of IT in business processes.

6. The basic conceptions of the interviewee about The Firm's Russian Trade strategies; Core competencies; In which matters The Firm is better than its competitors? Why The Firm is in Russia?
7. The interviewee's opinion about a databank, where there would be stored the details of all the Russian meetings and trips of The Firm's personnel, and all the matters discussed in those occasions.

All interviews have been tape recorded and part of them also transcribed. The total material consists of 34 no. of 90 minute c-cassettes, in all about 50 hours of discussions. A total of 14 people were interviewed in Moscow. At the headquarters in Finland a total of 18 interviews were conducted. As described above, the rest of the data consist of company documents, observation notes, and minutes of various meetings. However, it has to be noted that the most important of the methods were the tape recorded and partly transcribed interviews. The other methods have just been used to reach some understanding of The Firm and its processes.

Methodological choices

The data from Moscow were transcribed and converged into three case stories (Cf. Lacity & Hirschheim, 1995). The stories are reported in my recent research (Kangas, 1996a; 1996b).The challenge is how to fit the insights conveyed through case studies into a coherent, rational structure, and how to effectively communicate them. A rhetorical vehicle is needed for communicating them and still providing the reader with enough evidence to assess the validity (or believability) of the findings. The vehicle used is the "story". The story is an interpretation of the events described by the participants, who have become "characters" in the narratives.

The story mechanism is not used as an analytical tool (i.e. a way to analyze the data, for that the orthodox use of the case tool is more powerful), but rather as a rhetorical device to convey the themes or essences extracted from the analysis of the textual data collected. These essences (or themes) are the patterns (similarities) which cut across the three stories. They are not *a priori* constructs but emergent themes surfacing through the researcher's interpretation of the data.

While the stories capture the differences among the three different frameworks, lenses so to say, a search for characterizing common elements is performed to find common lessons to be learned from the research. These common lessons, which are called "morals" to maintain the story metaphor, describe

stakeholders attitudes, perceptions, and behaviors which are based on implicit assumptions about communication and information resources management.

Lenses and Frames

The lenses described above involve conceptual frameworks, which are: (i) The EMIS processual model; (see Exhibit I) (ii) The MIT90's framework (Scott Morton, 1991, see exhibit II) and ; (iii) Expanded contingency relationship for intra-corporate transactions (King & Sethi, 1992, see exhibit III). The ingredients of the frameworks have been applied to the data quite mechanically. The stories have been written in order to bring out meaningful units of data unregarded of their source (whether it be product of interviews, observations or other) - the "morals" of the stories. These morals have consisted of, on the one hand, themes that have been consistent in all views, and on the other hand, themes that have arisen as opposite polarities in the material.

6. Results

The objective of the research was to study how strategic thinking, especially frameworks of information technology (IT) strategies and organizational communication, created in western industrialized countries could be applied in trade transactions in technologically less developed countries and especially in Russia. The empirical studies, up to now, imply simply that the western frameworks used in the study can be used to assess and analyze the various aspects of information resources management, but what comes to applying them into formulation of IS strategies they fail to do that. The reason is that the meager communication infrastructure in Russia can not be exploited yet as means for generating competitive advantage. Therefore, those frameworks have to be renewed and reframed in order to fit the special Russian transition environment and infrastructure.

From the empirical data emerge six themes that, to some extent explain the patterns of the present state of Fenno-Russian trade. They allow to formulate pragmatic operative recommendations for coping with everyday activities. But what comes to a strategic use of information systems, they fail to provide any answers. The themes, morals of the stories, list as follows:

1. The meager IT and telecommunications infrastructure in Russia does not allow Western style exploitation of IS for competitive advantage yet but it is rapidly developing, and there is a strong call for this development, as well. However,

to create competitive advantage through IT in Russia, new or revised frameworks are needed for its implementation.

2. There is no best option for the Russian operations mode. At the moment, each enterprise operating there has its own special arrangements. In The Firm, the profit centers have their own divisional operative systems, which are used effectively and are perceived as of great importance to competition. On the other hand, for the corporate unit IT has only a tool value at the moment, and its management uses manual information systems.
3. Russia is different. It is neither part of Europe nor Asia. The international business culture in Russia is a strange mixture of the old artificial, dualistic Soviet system and new Western ideas of business making.
4. Russian business making is not pure social coziness, although personal and friendship relations have a very high value in business. The Russian business culture can to a certain extent be described as being made up of "Clans" (See e.g., Ouchi, 1980). Russians prefer more face-to-face contacts than any other mode of communication. So, the importance of electronic communication is lesser, at least for the moment. However business there has to be attended to as rigorously as anywhere else.
5. Russia is a strategically valuable and one of the most profitable business areas for Finnish companies, and in the future also for companies from other countries.
6. New organizational forms to manage the Russian trade must be sought for.

Managerial implications suggest that Russian trade can be attended to with less technological insight, but with fresh organizational ideas. The Russian trade manager's toolbox should in the future include better tools for examining the socio-economic environment, and helping aids for guiding their Russian counterparts into the stony path towards market economy. This is also well in concordance with Mata's et al.'s (1995) findings of managerial skills being the most valuable resource for creating sustained competitive advantage.

7. Implications for Future Research

A study of one organization can give the researcher only some improved understanding of the phenomena under scrutiny. Therefore extensive research in the field is required. This research should not only involve studies of similar settings, but as well comparisons with other areas. The problems of the extensive study should involve such matters as:

- To what extent can IT be used in business operations in less-developed transition countries?
- Can IT be a source of competitive advantage in those settings? Can this be studied, for example, through mirroring information resources against Porter's (1980) five competitive forces?
- Can Venkatraman's (1991) introduction of five levels of IT-induced reconfiguration give a measuring tool of the IT involvement in the Russian context?
- Is the Russian environment really something that can not be compared to any other setting?
- Which features make Russia different to others?
- Are firms attending differently to Russian involvement than to other environments?
- Mata et.al. (1995) state, based on their resource-based analysis, that managerial IT skills are the only attributes to create sustained competitive advantage through IT. This suggests that the entrepreneurial aspects should be emphasized when looking at the firm's resources and core competencies.

The future business strategy approach should concentrate on the resource-based theory of the firm (Penrose, 1959, 1985, 1995) and its strategic implications (Barney, 1986, 1991a, 1991b; Wernerfelt, 1984; Peteraf, 1993), the networked approach and globalization (Bartlett & Goshal, 1993, 1996; Jarvenpaa & Ives, 1994) as well as core competencies (Prahalad & Hamel, 1990; Hamel & Prahalad, 1990, 1994; Rumelt, 1994). The resource-based theory assumes that the heart of the of a firm's competitive advantage lies on the bundles of input services creating resources to be exploited, rather than on the product market combinations chosen for their deployment. That is to say that the approach calls for focusing on the firm, not as activities on the product market, but as a bundle of unique tangible and intangible resources to generate rents (added value). Of these resources already Penrose (1959) lifted entrepreneurship to be the most valuable. The resource-based approach gives an opportunity to view also the more recent approaches to core competencies and networking in a new and perhaps more comprehensive setting.

Some thoughts, however, have to be cast to the more market oriented positioning approaches, that are, for example, suggested by Michael E. Porter with his five forces of competition, three generic strategies, value chain formulations and the national diamond framework (Porter, 1980, 1985, 1990; Porter & Millar, 1985) and especially to extensions and contradictions of the diamond framework. For example, Rugman & D'Cruz (1993) claim that Porter's (1990) diamond framework is flawed and inapplicable in the new transnational arena where

companies no more have a specific home country which could set a base for their national factor generation, and therefore suggest their own double diamond framework involving the national diamonds of the both trading partners. Mintzberg (1994) preaches for the fall of strategic planning and for emergent strategies, which arise from entrepreneurship. (Cf. also Mintzberg & Quinn, 1996) The entrepreneurial approach is also in concordance with the original resource-based ideas of Penrose (1959, 1995).

My understanding is that the resource-based approach could give better results in studying the Russian setting. It seems that other frameworks that are based on different premises fail in explaining the phenomena in this particular case. Therefore the frameworks for creating competitive advantage in the Russian environment should be renewed and applied basing on the resource-based approach.

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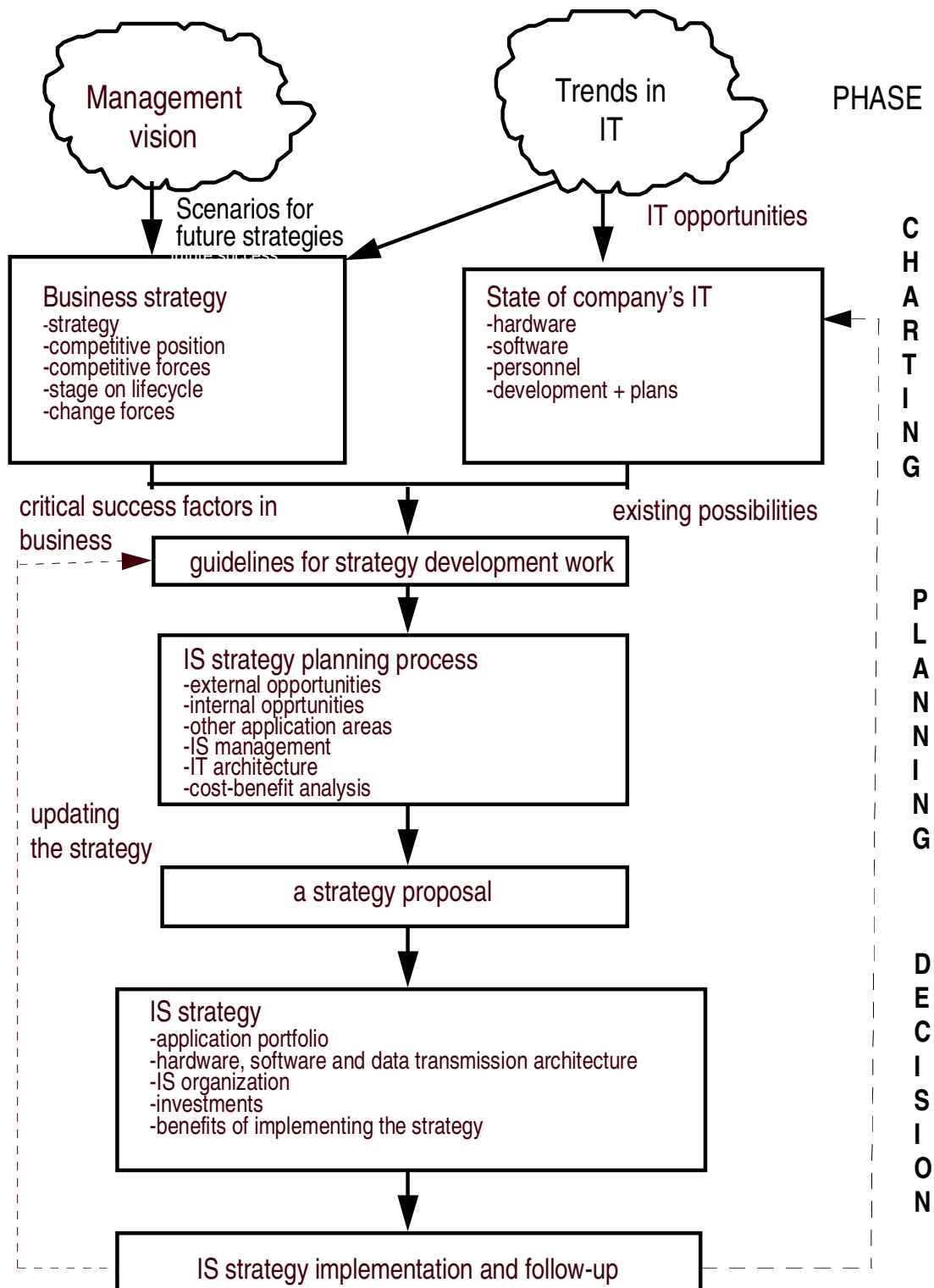


Exhibit I IS strategy evolution process. A procedural focus on the Emis model. Adapted from Reponen, 1990

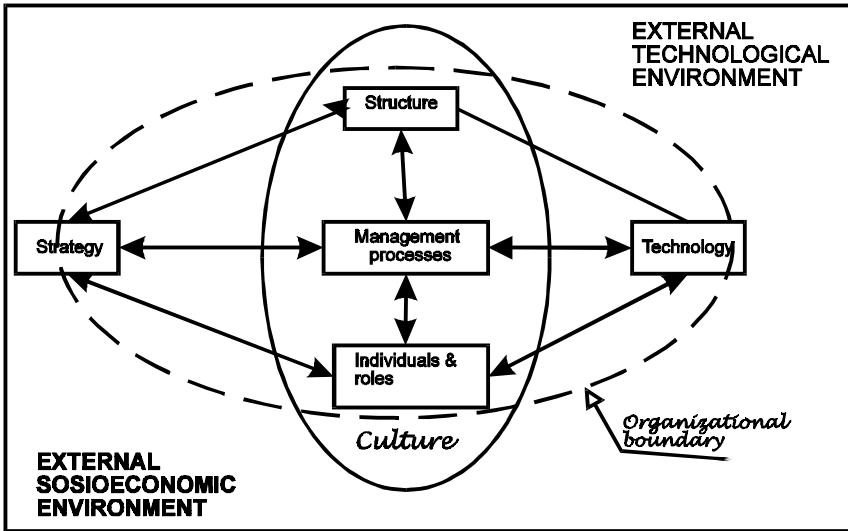


Exhibit II The MIT90's framework. Adapted from Scott Morton, 1991

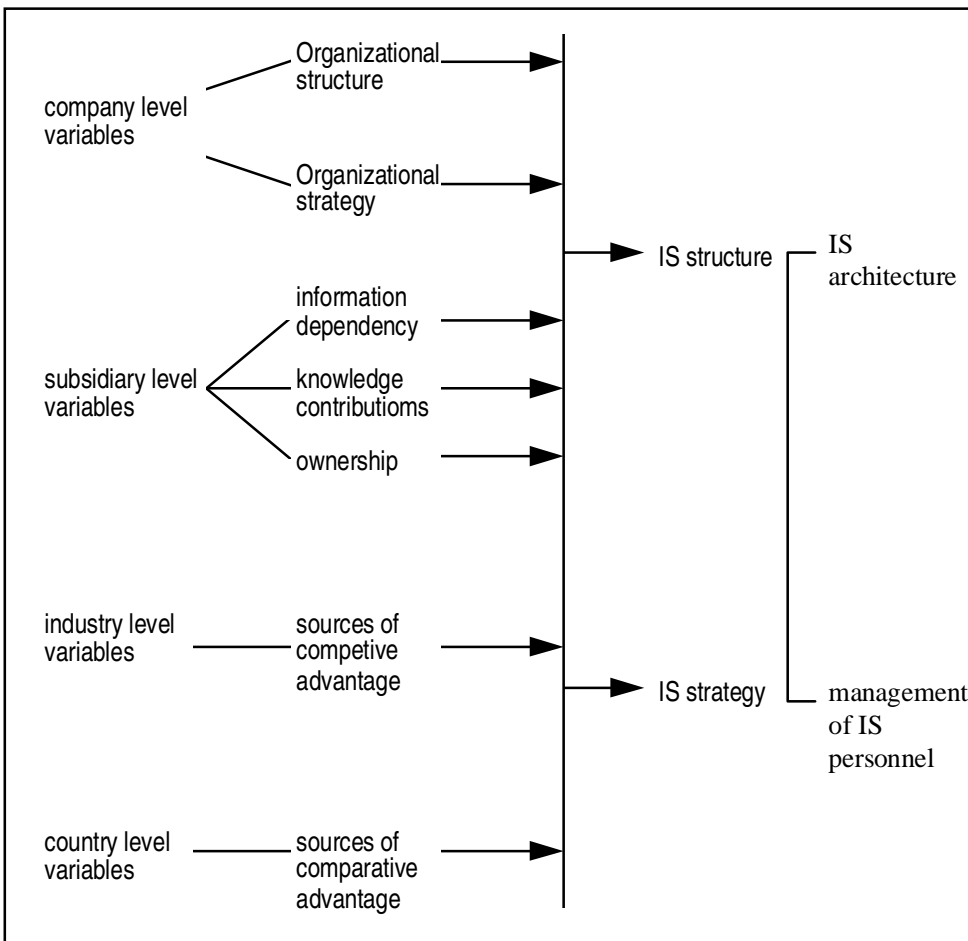


Exhibit III Expanded contingency relationship for intra-corporate transactions. Adapted from King & Sethi 1992

IS AND ORGANIZATIONAL TRANSFORMATION - A HISTORICAL ANALYSIS OF UUSIMAA LABOUR PROTECTION DISTRICT IN FINLAND

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Introduction

A change is going on towards new organizational forms of activity. The ability to react and adapt to the continuously changing environment is considered as a prerequisite for organization's competitiveness (e.g. Scott Morton 1991). Through demolishing hierarchies and building cooperative structures like teams, groups and networks, flexibility and efficiency are sought despite of the consequences of change. Empowered workers are solving problems and organizing their work in self-steering teams. Information systems are playing ever increasing role both as contributors and enablers in this transformation (e.g. Hammer - Champy 1993). But the effects of these transformations are not always what expected. It is claimed that about 70% of current business process re-engineering attempts in North America are failures (Guimaraes 1996).

This study is stimulated by the problems faced with one organization - Uusimaa Labour Protection District in Finland. New information system needs emerged after restructuring the organization into a modern team-based organization. Earlier as a bureaucratic governmental organization it has changed through several distinctive phases and information systems have played an important role in the latest developments. Based on the quite comprehensively documented history of the organizational development and my initial knowledge of organizational transformation and information systems, a starting hypothesis for the study has been formulated. This hypothesis assumes that there exists a dynamic relationship between organizational activity, management and information systems and changes in one of these elements affects the others. Management, while distinguished from the organizational activities, points to the

tasks of control, coordination and communication of the actual organizational activities, which are more referred as the operational part of work. In addition to the separate two-dimensional relationships between two elements an integrative combination of all the three elements needs also to be considered. When designing organizational activities and information systems supporting these activities it has affects for the managing of these activities as well. When changing organizational activities also the changing needs for management information systems should be considered.

To form a more profound understanding of the relationship between organizational activity, management and information systems the transformations in the case of ULPD will be studied. The history of the organization and its phases of development is analyzed to understand what has happened in regard to the relationship in one organization. Other approaches will be studied to find out how the existing theories relate to these findings. The Cultural Historical Activity Theory (CHAT) will be used as a theoretical framework both when analyzing the material and when formulating the final model of the relationship.

Other research approaches

Some aspects of the relationship are treated by many current research traditions. The tradition of management information systems research (MIS) and executive information systems (EIS) considers the use of information systems for managerial purposes. Especially the problem of information requirements determination, and the problem of measuring information system success have attracted substantial interest (e.g. Swanson 1987). Organizational research (OR) has been interested in the proper organizational design. Management theories like business process re-engineering (BPR) are considering the most effective ways of doing business. It is already quite generally accepted that information systems should be linked with business strategies and thereby the information systems have value only if they support the activities that people perform in the organizations (e.g. Galliers 1994). Computer supported cooperative work (CSCW) examines the possibilities and effects of technological support for humans involved in collaborative group communication and work processes (e.g. Bowers & Benford, 1991). Also the systems development tradition has started to question the values of the traditional approaches when designing systems for the emerging new forms of work and organizing (Orlikowski 1996). So the

relationship between organizational activities and information systems has been discussed quite extensively. The information systems should support the organizational work instead of just fitting the new technology into the organizational practice.

What about the management? It seems to be understood that management should take more responsibility of the process of acquiring information systems and be in charge of the unavoidable changes when implementing new information technology (Keen 1991). Sometimes the prevailing management model has influences on the way the work will be organized. What about the changes in managerial work - or is it changing? It is realized, that the new technology innovations enable the development of these new organizational forms (e.g. Scott Morton 1991) and within these organizations also new ways of managerial work should emerge (Tomasko 1993). Therefore it would be important to study also the actual changes in management, if there are any, and the information systems needs for supporting management work, in addition to the control information collected from the organizational activities.

The significance of the research

This research can be considered important from three perspectives. The relationship between organizational activities and information systems is well known and recognized. However, as Orlikowski et al. (1996) suggest, there is a need for the replacement of the current management ideologies concerning information technology as a support for hierarchy and control with alternative ideologies concerned with using information technology to enable human agency and augment human capacity. As an example they give the role of business process reengineering, and how it reflects prevailing management approaches of top-down control as a means of bringing about organizational change. Therefore when considering the management as an inseparable dynamic element of organizational transformation also the needs for changes in managerial work can be highlighted.

Secondly, more practical benefits can be gained from the research since the actual stimulus being the practical problems of the case organization. After the last transformation in the case organization some problems have occurred concerning, for example, the integration of information systems, sharing organizational information, managing the separate processes and integrating the

essential information with separate processes. The integration of information systems in this case does not concern purely technical systems but also the content of the different databases etc. Because of these problems some new information needs has been formulated to proceed to the next phase of development with information systems. Profound understanding of the situation in the case organization will help in the next step of their development work.

Some other organizations based on the emerging new forms and principles might be struggling with the same problems as the case organization in question. These organizations need new information systems not just to support their daily activities but also to support the management of these activities. This leads to the third benefit of this research. Information systems developers must create a more comprehensive view of the organizations and the consequences of transformations in order to understand the emerging new needs of information systems in these complex situations. Orlikowski et al. also challenge the modes and practices of systems development, reflecting and reinforcing as they do, particular views of management, technology, work and organizing. A contemporary challenge for design practice is how to account for and facilitate non-traditional views of work and work-organization. There is a "need to look beyond simple technocratic explanations of organizational change, and develop theoretical approaches that engage the complex interaction of social, technical, institutional and interpretive influences that shape organizational changes in specific contexts" (Orlikowski 1996). When understanding the dynamic relationship between organizational activity, management and information systems, the methods of analyzing and formulating systems needs can hopefully be improved.

The research problem

The main objective of this research is to form a more profound understanding, and underline the importance of the dynamic relationship between organizational activity, management and information systems -- *what is this relationship?* More accurately attention is given to the consequences of changes in these elements. What are the consequences of changes in the elements of this relationship? (see figure 1). The three elements of the relationship are inseparable, but the changes can be examined in two ways. First there may be changes in one element at the time affecting the other two. This is depicted with two-way arrows in the

triangle. The second way is more complex. The changes may also be coordinated between two elements at the time, forming a two-way relationship with the third element left outside this relationship. When trying to understand the consequences of change, the situation should be considered within the model created by this relationship.

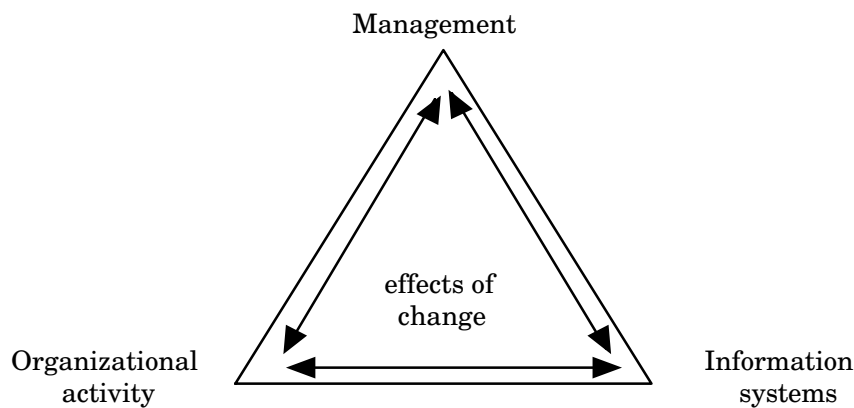


Figure 1: The dynamic relationship between organizational activity, management and information systems.

Based on the considerations of the nature of this relationship a preliminary view of the consequences of changes can be suggested.

1) Organizational activity - Information systems

While changing organizational work activities, new needs for information systems will emerge. Also when implementing new information systems, changes in organizational practices are unavoidable. While planning organizational activities the supportiveness of information systems should also be considered.

2) Management - Information systems

As with any information systems implementation, also with management information systems the changes in managerial work must be considered. While changing managerial work also the possible needs for information systems changes ought to be considered. This too should be integrated into the process of planning these possible changes.

3) Management - Organizational activity

The management model of the organization usually determines the structure and organization of the work activities. When changing into new forms of organizational activities the effects on the management of these activities should also be considered. Finding harmony in organizations is to integrate the changes in management and work activities.

4) Changes coordinated between two elements

When planning changes on organizational activities and the management also the effects on information systems needs should be considered. While implementing new information systems supporting work activities also the effect for the management needs should be considered. Finally, when implementing new management information systems they must be in the line with the work activities to be managed.

There are yet more questions than answers to the these questions that are based on empirical research. What kind of information system needs emerge in organizations with low hierarchies and new innovative work activities? What kind of new management activities and supporting information systems are needed, when the team-based process or network organizations are developed and supported with tailored information systems? What kind of impacts would the possible new management philosophies have on the organizational activities? Will the flexibility demands lead to the fact that the single organizational processes must again be managed centrally while individual workers are acting independently? So, how do the possible changes in the elements of the relationship relate to each other?

Some critique may be addressed to the separation of management from the organizational activities. This separation is necessary to distinguish between the tasks of control, coordination and communication from the more operational tasks of work activities. It is assumed, no matter how independent the individual workers are or how self conducting the organizational teams are, that this distinction between operative activities and management of these activities can be identified regardless of the actual division of work between the management and operational task within the work force. The information system needs will surely be different depending on the tasks to be considered. Neither is this study pure critique for the prevailing management traditions. Actually, it is more

appreciative relating to the current needs of management. The managers have been so busy adapting to the rapid changes, that they may have lost their own role in the process and forgot to consider their changing information system needs.

The research approach

A historical analysis of the case of ULPD will be done to form an understanding of the relationship between organizational activity, management and information systems in their organization. To gain some profound understanding of the relationship also other approaches will be studied. The Cultural Historical Activity Theory (CHAT) will be used as a theoretical framework during the research process.

Description of the Case

Uusimaa Labour Protection District (ULPD), located in Helsinki, is one of the eleven district authorities of labour protection in Finland. The main form of activity of the districts is the inspection of working premises done by labour protection inspectors. Inspection work in Finland has gone through several developments during the 1980's and 1990's. Especially ULPD has faced more difficulties due to high industrialization and the diversified structure of the industry in its district. ULPD has been continuously interested in organizing the protection work more efficiently and affectively.

ULPD's history is interesting with several developments in relatively short time. Based on initiative examination of the documented development history a preliminary view of the history has been formulated (see figure 2).

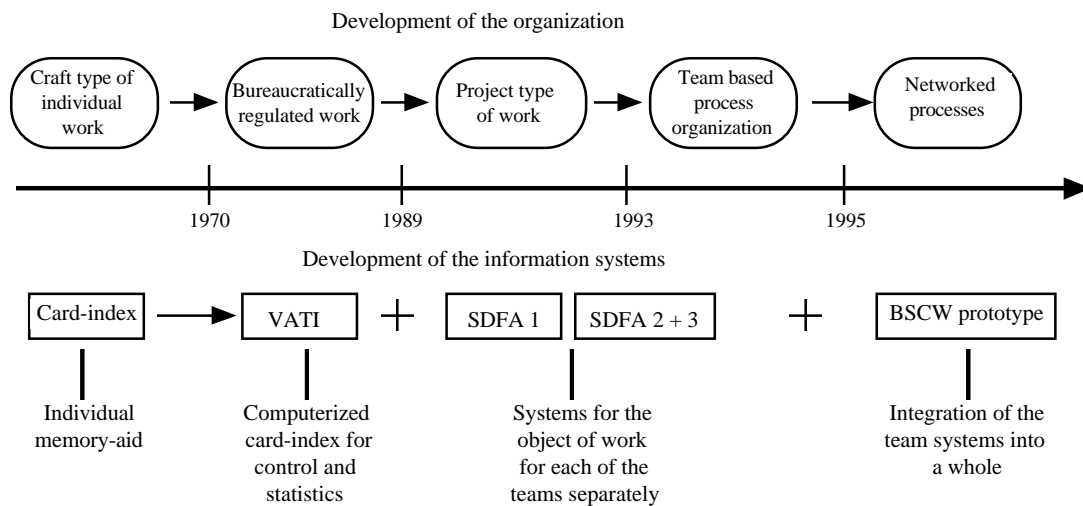


Figure 2: The historical development of organization and its information systems at the Uusimaa Labour Protection District.

Until the late 1980's the organization was separated into six inspection divisions, where only two of them were clearly based on lines of business while others were mainly regional. Division superiors directed the responsible inspectors of their divisions according to their own styles. Gradually, side by side with the formal organization, they started to initiate different projects in order to eliminate the most usual causes of accidents and professional illnesses and to set priorities for the lines of business to be inspected. Concurrently with the projects they started to develop a new information system to support these new analysing teams to form a shared understanding of the field and object of their activity (called system for depicting the field of activity - SDFA). An Excel-database was collected of the most hazardous workplaces at that time (construction business) to find out the amount of accidents or illnesses according to the companies, contracts, products, etc. With the new system ULPD aimed at setting up a more successful and economical inspection strategy for selecting, timing, measuring and focusing their activities. This phase of development also became important for the development of the mutual co-operation between the inspectors. The development of the project work and new tools started from one team working with construction industry. Because of its success, this new type of project work started to spread its way to other divisions of the district, and similar local, team-oriented databases and collections of documents started to develop also for the other important lines of business.

The research process and current status

Three tasks can be identified in this process even though they will overlap during the process.

1) As theoretical part other approaches to the organizational change involving information systems will be analyzed to collect and organize the current understanding of the relationship between organizational change and the development of information systems. How is this relationship identified in other research approaches - if it is found relevant in the first place? How is it expressed? What are the methods used in this kind of analysis? Is it possible to find some way to classify these other approaches? This analysis is conducted together with the analyzing of the history of the case organization and the relevant findings there will be focusing it.

2) A historical analysis of the case organization is conducted to understand the forementioned dynamic relationship in ULPD. The historical development of the organization is reconstructed based on the documented information collected from the case organization. The available material allows relatively fine-grained analysis of this development. If there are some gaps that makes the analysis inaccurate, some interviews will be done to enrich the written material. The interviews are considered possible since there are still people in the organization that have been there even at the very early phases of the organizational developments. The reasons for the well documented history are the extensive development projects done with the help of outsider consultants.

3) Finally, an attempt will be made to construct a more comprehensive model of the dynamic relationship between organizational activity, management and information systems. The Cultural Historical Activity Theory (CHAT) is used as the theoretical framework both for analyzing of the material and for connecting the theoretical findings with the practical case. CHAT uses activities as units of analysis of organizational work. Activities emphasize the fundamental reason of work - the object and the output - and they describe also the context of a work more accurately (Nardi, 1996). The tool is an essential element of activity. Since the needs for integrating the elements of the dynamic relationship (organizational activity, management and information systems) becomes an essential part of the study, CHAT can be used by seeing organizational activity as the object of

management activities and considering information systems as tools for both activities. The use of CHAT seems natural also because its extensive use in the different development phases of the case organization. These developments have followed the suggestions of the developmental work research approach. Developmental work research approach gives also useful guidance with the historical analysis of the case organization.

Currently the written material from the case organization is being analyzed in order to find the suitable questions for possible interviews. This analysis is done by focusing on the different work activity systems and management activity systems in the history of the case organization, analyzing also the supportive tools for these activity systems. At the same time the collection of relevant literature has started.

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MANAGEMENT OF TIME IN INFORMATION PROCESSES

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INTRODUCTION

This paper summarizes my empirical and theoretical work done up till now. Right now I am trying to build a theoretical framework that I can combine my empirical findings with. This paper is therefore somewhat disparate. The empirical and the theoretical parts are not combined. However, I have tried to organize the content so that it should be easy to follow what I have done in each part.

Information Management

This research is done with an Information Management (IM) perspective. Within IM we focus on how information, individuals and information technology interact within business. The focus is not on information technology per se but on its role within a business context. My thesis focuses on information flows and the need for shorter lead times in these processes and with an IM-perspective it is therefore important to look at the users (executives) needs and demands on the information, *and* the potential means for supplying this particular information, i.e. for example with help of information technology (IT).⁵

Background (the need for information and means for supplying it)

For several years now, lots of management literature have been written about the emergence of the “new organization” (see for example Tapscott & Caston, Kanter, Drucker, Hammer & Champy, Davenport). These transformed organizations are said to be flexible, customer focused, process oriented, apply total quality management and/or time based management concepts. Information

⁵ Information technology is a generic term for technologies used for gathering, processing, sending, presenting and communicating information.

technology is an important enabler and facilitator for these companies' abilities to transform. One could say that an extended and intelligent use of information technology is a prerequisite for this kind of organization. Information is the manager's key resource when trying to coordinate and manage a company organized in this way (autonomous groups, however, depended on each other) (Tapscott & Caston 1993).

However, I do not think we have to motivate a discussion about the importance of fast and timely information upon the latest management literature. Big companies have always been divided into different functions or likewise (the emergence of hierarchy - to handle disorder). This in turn, requires extensive information flows to support management in their work to coordinate the activities for a company as a whole.

Lundmark (1989), stresses that when we increase efficiency and productivity, time becomes more precious to us. Time becomes more expensive and therefore you want to get even more out of each unit of time through the use of powerful and efficient technology. Time then gets even higher valued and it becomes even more essential to improve the technology to be able to use time efficiently. This means that increased value of time and technical improvements stands in a reciprocal relation to each other (*ibid*, 122).

Previously almost all information supplied to senior managers was provided through the help of information providers, for example different staff groups. Since a couple of years back, there are computerized information systems aimed to be directly used by executives themselves. However, these systems seem to have failed, it is not a unknown fact that the influence on management practice has been very uneven. McKinnon and Bruns (1992, 190) concluded that much of the information delivered by these computerized information systems is not useful to managers and therefore not used. The reason is deficiencies in timeliness, accuracy and relevance. Simons (1995, 184) believes that senior managers have been slow to adopt IT, not because of limitation in the technology, but because designers of these systems do not understand how senior managers use information for control purposes.

I have explained above that we should study business and the users to define possible use (and secure actual use) of information technology.⁶ In line with this I have chosen to discuss the need for shorter lead times in reporting processes on the basis of a framework for control systems. In this framework, information is used with the purpose of controlling business, i.e. that actions taken are in line with the business strategy. I have assumed that managers and executives in

⁶ There may also be a need for a technology pull, since the technology is far beyond actual use today. I refrain from that discussion in this paper.

companies use the information they get in control purposes (they use it in other purposes too, but I make a delimitation here). One reason for this choice is my basic standpoint that lead times in reporting processes are means, means to accomplish faster access to information.⁷ If there is a need or not for shorter lead times is, in turn, dependent on the purpose with the information, how it is used. The information itself is in this sense a condition that influences lead times.

Research question and purpose

My tentative research question is; What characterizes companies with time efficient or short lead times in administrative processes compared to other companies?

There are a number of questions I would like to answer (with help a combination of theory and empirical findings) as part of this research question; When it is relevant with faster information flows within organizations? If it is found relevant with faster information, how is it feasible to accomplish? I have defined relevance of shorter lead times on the basis of the user and their needs. Feasibility is tentatively defined on the basis of the possible means for supplying the information, i.e. with help of information technology. In order to answer these questions, the purpose with the research is

- to describe conditions that influence reporting times of financial information in large Swedish companies⁸ and to discuss how and in what way they influence the reporting times.

When I talk about lead time, I refer to the time that elapses between an event and when information about it, is available. I discuss the relevance and feasibility of shorter lead times on the basis of a theoretical framework developed by Robert Simons (1995). Simons framework illustrates how managers control the overall business strategy using four basic levers; the belief systems, boundary systems, diagnostic control systems and interactive control systems.⁹ The framework focus

⁷ There may be circumstances where a short lead time is a goal itself. I have empirical findings that point in this direction, however, I refrain from this discussion in this particular paper.

⁸ I refer companies among the 200 biggest, with respect to turnover and number of employees. A company ranking is done on a yearly basis by for example the business journal "Veckans Affärer" and includes Sweden's top 500 which means companies with turnover over 250 Millions Skr. All ranked companies are corporate groups, where the Swedish mother company is the highest organizational level.

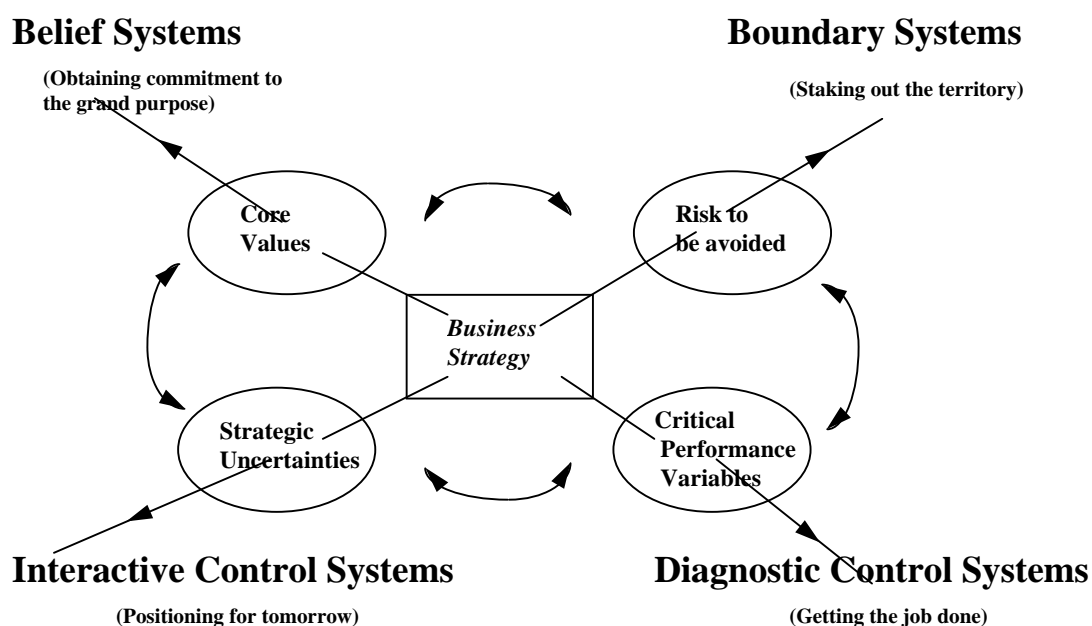
⁹ In my thesis this framework can be discussed in relation to other frameworks discussing the same topic. Anthony for example, discuss a managers control activities in terms of strategic planning, management control and task control (1988).

primarily on the informational aspect of management control systems, the levers managers use to transmit and process information within organizations.

RELEVANCE - THE USER PERSPECTIVE

Simons (1995) defines management control systems as “the formal information-based routines and procedures managers use to maintain or alter patterns in organizational activities” (ibid, 5). These persons use information for example to signal the domain in which subordinates should search for opportunities, to communicate plans, instructions and goals and to monitor the achievement of plans and goals, but also to keep informed and inform others. Simons means that these information-based systems become control systems when they are used to maintain or alter patterns in organizational activities.

This is his framework:



Simons 1995

In the center is the business strategy, how a company decides to compete and position itself towards its competitors. This is the core of the analysis. The second level is four key constructs that must be understood to be able to successfully implement the strategy. These are the core values, the risk to be avoided, the strategic uncertainties and the critical performance variables. Each of these constructs are controlled by a different system. The first one is the belief system that is used to inspire and direct the search for new opportunities. The

second is the boundary system that is used to set limits on opportunity seeking behavior. The third one is the diagnostic control system, that is used to motivate, monitor and reward achievement of specific goals and finally the interactive control system that is used to stimulate organizational learning and the emergence of new ideas and strategies. Strategic control is not achieved through new and unique systems but through beliefs, boundary, diagnostic and interactive control system working in concert to control both the implementation of intended strategies and the formation of emergent strategies.

FEASIBILITY - THE IT PERSPECTIVE

The information

Boisot (1986) divides information according to two attributes; information codification and information diffusion. *Codification* refers to the structuring of information by categorizing and compressing data. Descriptive statistics and financial statement information represent highly codified information. *Information diffusion* is the degree of information sharing within an organization. Diffusion is high if the information can be transmitted easily to everyone in the organization, diffusion is low if the information is available to only a small subset of the organization. The difference between codification and diffusion is shown in the table below.

High Codification	Board of directors briefing book	Financial accounting data
	Trade show gossip	Stories about charismatic founder
	Low	High

Diffusion

The information used within each control lever and feasible IT-support.

In the discussion below regarding feasible information technology I refer mainly to computerized information systems.

A formal belief system is created and communicated through documents as credos, mission statements and statements of purpose. The information is personal and therefore uncoded and the aim is to spread the information in the entire organization on a periodic basis. One aim with using information technology is to overcome distance (time, geographical) in order to spread or diffuse information in the entire organization. The personalized message used in belief systems can be supported with audio-video conferencing and/or electronic mail (and of course, phone and fax).

The purpose with the boundary control system is to stake out the strategic domain. The information used in this purpose is highly uncoded and unambiguous and the aim is to spread it in the entire organization on a periodic basis. A control system needs guardians that ensure that the rules are followed. Information technology can help through supplying checks or delimit user responsibility to perform different operations, i.e. depending on responsibility, the user can access different kinds of information or applications. Used software systems can also warn users if they are to cross borders.

The information transmitted through diagnostic control systems is highly coded. The aim is to measure and monitor critical performance variables. The information is often data from financial accounting system. The information should reach the responsible managers on an exception basis and/or on a recurrent basis to let them know that the business is on track. Today, there are real time based accounting, reporting and consolidating systems, i.e. as soon as we record the collected data it will show in reports or information gathered from the information system. Lead time is in this case the time that elapses between the event and when information about it, is recorded. If this time is close to zero we have almost no lead time at all.

An interactive control system must be easy to understand since the aim is to support the entire management group with information on an ongoing basis. The information is semi-coded, some of it may be easily coded and some of it gain from verbal discussions. There are several IT-tools that can be used to support the interactive control system. Complex data can for example be visualized in charts. Market information can be made easily available to everyone that needs it through direct access to external and internal databases. It is also possible to ask what-if questions on disparate data material or build different scenarios.

Combining relevance and feasibility

In the table below, I have concluded whether or not it is relevant and feasible with shorter lead times in supplying managers/executives with information in the different purposes discussed above.¹⁰

Table 1 Relevance and feasibility of faster information

	Belief system	Boun- dary control system	Diagn- ostic control system	Interact- ive control system
Relevance (User- perspective)	NO	NO	YES	YES
Feasibility (IT- perspective)	-	-	YES	YES

On the basis of the user's information needs, the type of information (codification/diffusion) and its purposes (defined by the control levers) are shorter lead times not relevant in belief nor boundary systems. Note that I have assumed that if it is not relevant with shorter lead times it is not fruitful to discuss the means for fulfilling it. There is information technology that partly supports these control systems, but the lead time, the time between an event until information is spread about it, is not of primary interest in these systems. Regarding the other two control systems there is a potential need for and relevance of shorter lead times.

The lead times' importance depend on how and in what purpose the information is used. It also depends on what other kinds of information or signals the executives get. In this sense, recurrent financial reports are not directly necessary to receive as fast as possible. One day more or less does not matter, because the information is used to see if the company is on track. It is therefore more important that the information is timely, i.e. according to defined deadlines (Anthony 1988). These recurrent financial reports, should however, arrive in

¹⁰ One important dimension of feasibility is not discussed. This regards the costs connected to extensive information technology use. I have excluded this because of problems with making relevant estimates.

close connection to the time-period they refer to. Otherwise the information loses value. From this point of view it should in any case, be desirable with as short lead time as possible (given that the information still is accurate and reliable). To this comes efficiency gains that can be achieved when eliminating manual routines and integrating disparate system islands. This may in turn result in shorter lead times (Tapscott & Caston, 1993).

However, if the focus is on information about deviations from “normal”, it is necessary and desirable to get hold on to the information, as soon as possible. The information makes executives aware of changing conditions. Therefore should exception reporting or early warning reports be supplied fast. With fast I mean that it should be delivered as soon as possible after the event has occurred or the activities that were a consequence of the event have occurred. This early warning system can be supported by real time based information systems. Simons (1995) stresses that this kind of information should not rely on formal reports, it should be supplied directly. In total I conclude that it is relevant with shorter lead times and it is also feasible.

The interactive control systems' information is semi-coded. Parts of it can be financial numbers and parts of it can be written or verbal comments or likewise directly transferred from a manager to a senior executive. The users (managers on all levels) are continuously involved, which means that there is a need for short lead times. Depending on how the senior manager chooses to define their interactive system, different parts of it may be more or less easily to support with information technology. For those parts that is suitable for computerization, real time based system are suitable. The other part can be supported by telephone, fax or email, (which of course, also can be seen as real time based).

Theoretical framework and empirical findings - how to proceed

On the basis of the theoretical framework I can conclude that it is interesting and relevant with shorter lead times under certain circumstances. In contrast to this my empirical findings say something else. The average reporting time, i.e. the point in time when the group executive board receive a report, is 13 working days after the end of the month. A minority wants to compress the lead times (Nilsson 1994, see also below). That is, there is a discrepancy between theory and reality. There seem to be other things than the purpose with the information and the technology that affect the lead times. What is it? What conditions influence reporting times?

Below follows a presentation of my empirical material. NB! It is not sorted, nor grouped in accordance to Simons framework.

CONDITIONS THAT INFLUENCE REPORTING TIMES

My research approach

I focus on the reporting process of financial information¹¹. Hammer & Champy (1993) define a process as a set of activities that, taken together, produces a result of value to a customer. If we translate this definition to a reporting process containing financial information, the process includes all activities needed to produce the financial report (the result). The process ends when the group executive board receive the report - they are the final customers. The beginning of the process occurs when the first actions are taken in order to supply information that is part of the final report.

The research has from the beginning been empirically driven. The empirical findings have had a major influence on my choice of problems to investigate. I have not found any similar studies and therefore chosen an *explorative* study.

Hitherto I have conducted a case study in three big multinational manufacturing firms in Sweden. The case study resulted in a number of circumstances that influence reporting times and it was based on semi structured interviews (Nilsson, 1993). The most important one turned out to be the interest that managers on all levels give the question. To be able to compress lead times there must be an extensive support from executives and those that are responsible for delivering the information.

The case study was followed by a postal survey send to the 200 biggest companies in Sweden (210 with the major banks and insurance companies included). One purpose with the survey was to create a picture over the prevailing reporting times when it comes to monthly and quarterly financial reports to the executive board and what the respondents think about these. The questionnaire was sent to the financial manager (CFOs) in Sweden's 200 largest

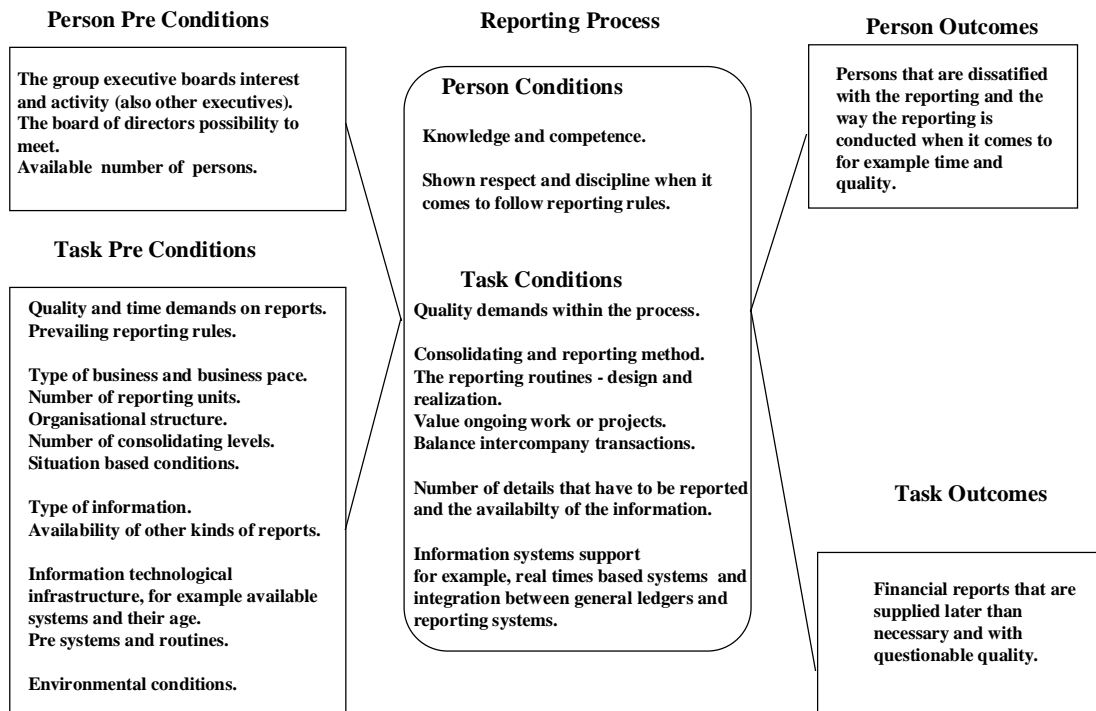
¹¹ With *financial information* (or a financial report) I refer to information that is used to analyze the business activities in financial terms. It is some kind of calculated measurement, such as the gross or operating income. However, the information or the report does not have to be a full income/loss statement according to prevailing accounting standards

companies. The response rate was 83 % (Nilsson, 1994, Report no 1 & 2).¹² The respondents were also asked to name and rank three conditions that, according to their experience, have major influence on reporting times. Out of 400 named conditions 29 % related to information systems which made it the biggest group. This was followed by conditions that relate to the organization (25%). In contrast to the pre study only 17% of the conditions related to the interest and support from executives, i.e. it was not experienced as a major concern.

A COMBINATION OF THE TWO STUDIES.

During the initial case study, I realized that there is a difference between the conditions in that way that some of them concern pre conditions for reporting and some of them are more directly related to the actual reporting process. To emphasize this, I have hitherto chosen to work with a process framework, the so called X-model (Lundeberg, 1993). The X-model can be used to analyze and understand processes and the results of the processes. The model separate circumstances that relate to pre conditions for a process or the process itself. It also separates circumstances that relate to persons and/or task conditions. In understanding why outcomes turn out the way they do, the reasons may be found in either person or task conditions or person or task conditions in the process. Even if the approaches between the two studies differ there is a great resemblance between the identified conditions in the pre study and the survey. I have now compared and analyzed the results from the two separate studies, the framework is depicted in the picture below (Nilsson, 1995).

¹² For a monthly financial report the average reporting time turned out to be 13 *working days* after the closing of the accounting period (stdev. 6.3, 147 companies). 41 % of the respondents thought that the lead time ought to be cut with in average 4 working days *within 12 months*. 57 % of the respondents were satisfied with the prevailing reporting times (Nilsson 1994, Report no. 1).



Picture 2 Framework of conditions that influence reporting times of financial information.

Read the picture from left to right: The group executive board and the board of directors are the persons who define goals for a particular company. This is done with consideration to the conducted business activities, organizational structure, persons involved and so on. The formulated goals also concern the reporting process of financial information. For example what role these reports play in the overall control system. These are pre conditions for the reporting process and they guide the reporting process (compare with Simons 1995). The reporting process includes a number of persons, with different needs and demands. Different kinds of reporting routines are conducted (for example balancing accounts). As support, involved persons to some extent use information systems. The result of the reporting process is in this case a financial report. Today, the reports are too late, the quality is questionable and the receivers are not totally satisfied with the process. Explanation to the prevailing reporting times can be found either among the pre conditions or in the reporting process itself.

The framework gives a comprehensive picture over areas that are important to consider if one wants to compress lead times. However, an application in a specific case or situation will reveal that different conditions are more or less important.

Next steps

The next step within the research project is to work through the pictured framework again and decide if it is necessary to gather more data on some of the conditions. I also want and intend to analyze if it would be fruitful to classify, sort or arrange the found conditions in another way. To find this out I intend to study theory in order to build a theoretical framework. I have also partly tested the framework through a couple of interviews in a company where they recently cut the lead times with 50%. These interviews have given quite explicit explanations to experienced problems in the change process.

Simons framework explains when it is interesting with shorter lead times in information flows with control purposes. I can compare how the different explanations within the framework correspond to my empirical findings. The framework explains one very important issue here, the information and its purposes.

However, my empirical findings are more detailed and cover more areas than the framework does right now. Some of it refers more to the question regarding how to accomplish faster reporting. I think the framework can be extended, different parts of it can be further developed and discussed based on other researchers findings. Right now I plan to develop a theoretical framework in two steps, 1) I define when and why it is interesting with shorter lead times, 2) Given this context, I define what may influence the lead times i.e. the purpose with the information is implicit in the discussion.

Questions that I ask myself now:

Maybe this is not about lead times in reporting at all, rather about time in general, peoples attitudes towards time. How managers use time when they try to control or manage a company. The lead time in reporting is just a symptom. Maybe I need a theory of time?

Maybe this is about technology as a barrier instead of an enabler. All this technology, huge reporting systems, systems designed for users that do not use them, separate systems that we can not integrate and so on. Maybe we are creating complex solutions to simple problems?

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EVALUATION OF MUNICIPAL INFORMATION-INFRASTRUCTURE

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Abstract

Identification and evaluation of costs, risks and benefits of information-infrastructure is difficult. Many stakeholders are involved and costs and benefits are unequally distributed among these stakeholders. Most of the existing IS evaluation methods are hardly used in planning and development of information-infrastructure. This research project aims at better understanding of the meaning of evaluation in a multi-actor decision making process. By means of four case-studies decision-making processes on municipal information-infrastructure are analyzed in terms of context, process and contents. Preliminary findings of the research suggest that evaluation primarily supports negotiation, rather than determining the exact value of information-infrastructure. Furthermore the stage of organizational development, especially with regard to IT planning experience, influences the usability of evaluation methods.

Introduction

How can investments in information-technology be justified? This is perhaps one of the most frequently asked questions in both information systems research and practice. Especially identification of costs, risks and benefits of information-infrastructure is difficult. Many stakeholders are involved in the decision-making process and cost, risks and benefits are unequally distributed among the stakeholders. Furthermore, because of the basic character of information-infrastructure, its benefits are mostly of an indirect, often intangible nature. Some methods for identification and evaluation of cost, risks and benefits of information technology have been developed [FA92]. However, research indicates that in most cases formal evaluation is hardly done [SY91][AV95]. In

the few cases that evaluation methods are used they mostly are traditional, financially oriented methods like net present value analysis.

This paper summarizes a research project which aims at better understanding of the meaning of evaluation in a multi-actor decision making process. So far evaluation of information systems is often studied in cases in which a single person or business unit has to choose from a set of possible information systems projects. Decision making on information-infrastructure is quite different. In this research project theories on multi-actor decision making and IS-evaluation are used to analyse four case-studies about the development of municipal information-infrastructure. More specifically we want to answer the following research questions:

- How can the decision-making process on information-infrastructure in municipal organizations be described?
- How can evaluation be used to support multi-actor decision making processes on information-infrastructure?
- What contextual factors determine the usability of evaluation methods in decision-making on information-infrastructure?

The ultimate goal of this project is the development of a conceptual model of the decision making process on information-infrastructure. This model should serve as a framework for managing IS/IT-decision processes in which many stakeholders are involved.

Relevance

This research project focusses on the evaluation of municipal information-infrastructure. Information-infrastructure is defined here as a set of information facilities for shared use in an organization. Besides hardware, software and data information-infrastructure can also encompass a specific body of knowledge, skill set and experience that provides the policies, planning, design, construction and operations capability necessary for viable delivery of information services [KE91]. For quite some time this broad definition of infrastructure was typical european, nowadays it is also used in American Journals [ZA87][BY95].

Infrastructure facilities are distinguished from facilities used by a single department or business unit. In the municipal organization datacommunication

networks and databases with data on population and real estate are typical examples of information-infrastructure. In the Netherlands most municipal organizations are currently faced with major investment decisions on information-infrastructure. Following the decentralization of the organizational structure in the 1980's, the management and development of information systems was also decentralized. Nowadays many organizations suffer from the negative consequences of this decentralization, sometimes referred to as "island automation". Municipal departments are not able to exchange information and a lot of information is kept at multiple locations. The increasing demand for quality and flexibility of municipal services urges municipal organizations to rethink their information management. Information-infrastructure helps managing interdependence between the information facilities in the organization [RO89][KE91][SC91][GR96]. It allows the decentralized parts of the organization to manage their information facilities, while maintaining the coherence between these facilities.

In practice decision making on information-infrastructure is difficult. A pilot case-study as part of this research project¹³ indicated that especially evaluation of costs and benefits is a bottleneck in decision making. During planning, development and implementation of the infrastructure several evaluations were carried out. Rather than determining the exact value of the infrastructure, evaluation provided information for negotiation.

¹³ The case-study was conducted in one of the largest municipal organizations in the Netherlands. Topic of research were the decision-making and evaluation processes concerning an organization-wide telecommunications network. Information was gathered from documents and interviews with project leaders and decision-makers.

Findings from the pilot case-study

- The development of the telecommunications network was part of a far-reaching process of organizational change involving, hierarchical structures, work processes and communication structures;
- The decision-making process did not follow a predefined order of steps;
- All stakeholders agreed on the need for evaluation results for making decisions about planning and development of infrastructure;
- Most stakeholders were not able to formulate evaluation criteria themselves
- Most stakeholders were not able to provide data for the actual evaluation process, due to a general lack of insight in costs and benefits of information technology;
- In the first stages of the decision process, the stakeholders used qualitative evaluation criteria for justifying the development of the network;
- As the development of the network left the conceptual stage and the consequences for the organizations became clear, the stakeholders did only accept financial evaluation criteria;
- When the network was almost realized, some stakeholders tried to prevent implementation by starting a new evaluation process.

Theoretical foundation

Research on information systems evaluation is often focussed on designing or refining evaluation methods which can quantify intangible benefits, costs and risks of information technology. However, these attempts have not resulted in a commonly accepted framework for evaluation [SY88]. A variety of evaluation methods has been developed, often linked to a specific context [IR91]. Methods like Information Economics have been developed for evaluating IT investments at business unit level [PA88]. Information-infrastructure reaches beyond the boundaries of business units or even organizations. Moreover most methods are not used in practice because of their complexity. For example, from a theoretical point of view, option theory seems to be able to provide the right tools for identifying benefits of information-infrastructure [DO91]. In practice however, application of option theory becomes very complex and is therefore hardly used.

What can we learn from these disappointing experiences? Perhaps many researchers have been focussing on the wrong problem. Instead of refining or developing another evaluation method which can handle even more intangibles than the existing ones, this research aims at a better understanding of the evaluation process itself. Only when we really know the meaning of evaluation in the decision-making process on information-infrastructure, we will be able to choose or design suitable evaluation methods.

The fact that most evaluation methods are not used in practice is perhaps also due to a wrong perception of organizations and information systems [BO87][WA93]. Much of the literature on IS in general and IS evaluation in particular takes a formal rational view of organizations. This view assumes that organizations have well defined goals and use information and information technology as instruments to reach these goals. Information systems are conceptualized as neutral tools or techniques which can be developed or removed when necessary. Evaluation is seen as a largely quantitative process of calculating the preferred choice and evaluating the likely cost/benefit on the basis of clearly defined criteria. From this formal rational point of view, more sophisticated evaluation methods would provide better information for making decisions on IT investments. However this kind of reasoning does not apply to a multi-actor decision-making context. Development of information-infrastructure is a highly political process depending on the particular interests of the stakeholders [WE89][AV95]

Understanding the meaning of evaluation in a multi-actor decision-making process requires theories and frameworks which can cope with contradictory interests. Therefore this research project will study evaluation from a social systems view on organizations and decision-making. As a response to the formal rational view on organizations and information systems, a variety of theories has emphasized that information systems are social systems. [BO87][WA93]. An information system influences its context and is at the same time influenced by its context. An information system cannot be analyzed independently from the social and organizational arrangements which form its environment (Hirscheim). Following this "social systems" view, decision-making on information systems is not a rational process following clearly defined steps. Consequently evaluation can no longer be regarded as an objective process following clearly defined methodological rules.

If decision-making on information-infrastructure is not a systematic rational process, what is the value of an information systems evaluation method? To

answer this question we can use findings from evaluation research in other areas, for example from work on the assessment of public programs of social change [LG84]. Legge notes that the basic rationale for evaluation is that it provides information for action. He distinguishes overt and covert functions. The primary (overt) function is then to contribute to the rationalism of decision-making. The covert functions for evaluation are often of greater importance for the understanding of evaluation than the overt official rationale [LG84]. Examples of covert functions are:

- postponement of a decision;
- evasion of responsibility;
- rallying support for/opposition to a change program;
- public relations exercises;
- fulfilling grant requirements.

Both the overt and the covert functions can be supported by formal evaluation methods. Instead of determining the value information-infrastructure, the formal evaluation method is supportive to the decision-making process. It triggers activity among the stakeholders and gives information for negotiation.

Research model

Evaluation of information systems cannot be separated from the evaluation of other organizational changes involved in the organization's strategy [AG95]. Acceptance of information infrastructure requires acceptance and support for the organizational changes of which the infrastructure development is a part of. Following Pettigrew's ideas on management of change, Symons [SY91] suggested that evaluation of information systems should be seen as part of organizational change, defined in terms of its contents, context and process.

Context refers to the organizational and broader socio-economic environment.

Process refers to the actions, reactions and interactions of interested parties involved in the information systems evaluation.

Content refers to the criteria used to assess a proposed or an implemented change of information systems.

Given the characteristics of information-infrastructure and decision-making in the municipal organization, the context-process-contents framework offered the most suitable research model for answering the research questions. By means of a pilot case-study and literature research this framework was further refined.

Context, process and contents have become clusters of variables. Within the clusters variables may correlate, this can be a problem in quantitative research methods. However, this model is used for a qualitative research approach. The case-studies are used to get a full picture of the evaluation process.

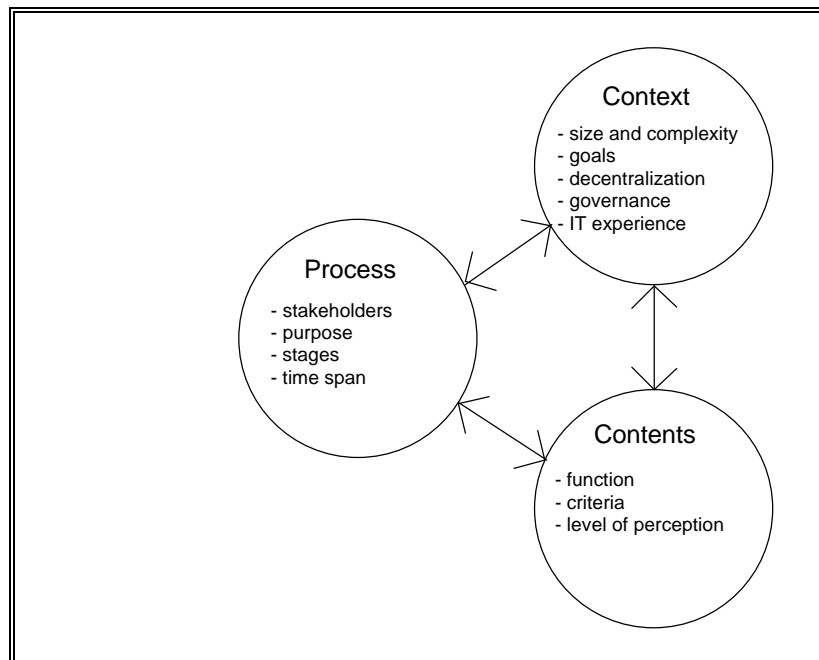


Figure 1. Research model

Contents

Function of evaluation: Legge [LG84] distinguishes overt and covert functions.

Hawgood and Land [HA88] give the following (overt) functions of evaluation:

- justification
- comparison among different projects competing for resources
- measures for control of the project
- learning experience (ex-post evaluation)

Criteria: Different classifications of evaluation criteria have been used [BA92]:

- qualitative/quantitative,
- financial/management/development criteria
- direct/indirect
- business domain/technology domain

Level of perception: Information-infrastructure is a relative concept. Stakeholders at different organizational levels are involved. The infrastructure can be evaluated from an organizational point of view, from departmental points of view, etc.

Context

Size: Size and environmental complexity determine the information complexity in an organization. Information complexity is defined as the product of the functionality and reach (number of users, terminals, etc.) of the information system [NI93].

Environmental complexity: Complexity of the environment is often associated with uncertainty. Literature gives no precise definition of complexity but it can be described in terms of demand fluctuations, increasing customer demands, and market heterogeneity. In municipalities, social and environmental problems influence municipal policy making. Increased environmental complexity leads to higher information demands [MA93][GB93].

Organizational goals

Level of decentralization: The centralized or decentralized character of the organization and the IT organization in particular can be described by the distribution of policy-making responsibilities and budget allocation [TR90].

Concept of governance: The concept of governance describes how the organization in general and IT in particular is managed. Besides the level of decentralization it refers to management style (authority versus consensus), cooperation culture and the level of formalization of rules, procedures and information flows [KE91][GB93].

Experience with information technology: The prior history of planning, development and implementing information systems has a strong influence on decision-making about information technology.

Process

Stakeholders: Stakeholders are individuals, groups, organization departments or other organizations which have a positive or negative interest in the development of information-infrastructure.

Purpose

Stages in the decision process: Evaluation can take place at different moments during the decision process on information-infrastructure. Farbey, Land and Targett recognize the following stages in the development and implementation of an IT project [FA92]:

1. strategy development
2. definition of a specific project (application or IT infrastructure)
3. development
4. implementation
5. evaluation, shortly after implementation
6. evaluation, after a period of operation
7. replacement

Time span

Methodology

The difficulties of evaluation in its context are the determining factors in the application of any formal evaluation method and must be addressed if the process of evaluation is to be understood. A qualitative research method like the case-study seems to be the most suitable method for getting a full picture of the evaluation process [GA91][WA93]. With help of the Dutch Association of Municipalities and other experts in this field, four municipalities were selected for this research project. The selection criteria were size and the level of decentralization. These contextual variables were expected to have a relationship with the reach and range of the information-infrastructure and the nature of the multi-actor decision making process. In highly centralized organizations the municipal departments will have less opportunities to participate in the decision making process. In a highly decentralized organization the municipal departments are expected to have considerable power and more opportunities to participate in the decision-making process. Maximum variance on these variables will support understanding of the relationship between the decision making context and evaluation [YI94].

Using the case-study results for developing a conceptual model for multi-actor decision processes can be justified from an interpretive point of view. The extrapolation from one or more individual cases does not depend on the representiveness of such cases in a statistical sense, but on the plausibility and cogency of the logical reasoning used in describing results from the cases, and in drawing inferences and conclusions from those results [WA93][YI94].

	relatively decentralized	relatively centralized
medium sized (50.000 >> 75.000 inhabitants)	case 1	case 3
Large (>150.000 inhabitants)	case 2	case 4

Figure 2. Case-study design

For each case-study 3 to 6 interviews are being held. On average the interviews take 1,5 hours. The interviews are semi-structured; the research model guides the formulation of interview questions. The questions have an open-end character. All interviews are recorded on tape and transcriptions are made. If necessary, the interviewee is contacted a second time for complementary or clarifying questions. The first interviewee is the chief information manager as the responsible manager for organization wide information management. The other interviewees are departmental managers and projectleaders responsible for infrastructure projects. The document analysis encompasses general strategic plans, information plans, expert reports on infrastructure and minutes of relevant (decision) meetings. After analyzing the four case-studies, the findings will be presented to the interviewees, their comments for further interpretation of the case-study results. The next step is the design of the conceptual model which will be tested in a field experiment.

Preliminary findings:

The following factors seem to influence the meaning of evaluation in municipal decision-making processes.

1. *The existence of general strategic plans and information plans.*

In the cases without clearly defined (information) planning, the development of information-infrastructure is driven by severe bottlenecks in the IT organization ("bottom up" development). Municipalities with clear (information) plans also incorporate a vision on IT in the design of infrastructures ("top down" development). Municipalities without a strategic (information) plan have much more difficulty in selecting evaluation criteria and the use of evaluation methods. Many evaluation methods derive indirect benefits from the contribution of information systems to strategic goals. If the strategic (information) goals are not known, application of methods like Information Economics is very difficult.

2. *The reputation of the individuals/departments which took the initiative for developing the information-infrastructure.*

Most initiatives for developing infrastructure come from the chief information manager or the information systems department. If they have been involved in unsuccessful projects, their evaluation criteria are no longer accepted. In cases this appeared to be a prerequisite constraint. In one case it even stops every infrastructural initiative.

3. *Experience with decision-making on information systems.*

Although this seems very obvious, lack of experience is a severe problem in municipal organizations. Until recently, decisions on information systems were left to information systems departments. Neither political nor general management is used to talk about information as an organizational resource. Evaluation criteria which refer to the linkage between information-technology and the core processes of the organization are seldom used. The stakeholders are not able to translate these criteria into the municipal situation.

Expected contribution and discussion

First of all the research is expected to contribute to better understanding of evaluation of information systems in a multiple-stakeholder environment. This area of evaluation has often been neglected. A promising research area for evaluation of information-infrastructure is the development of methods for stakeholder analysis [MAS83][RU91]. Such methods support identification and analysis of the different stakeholder perspectives. In addition further research is needed to clarify the relationship between the different stakeholder perspectives and the actual evaluation criteria used by the stakeholders. In other words: how do stakeholders "translate" their perspectives on information-infrastructure into evaluation criteria and which contextual factors influence the formulation and usage of these criteria?

The research further evaluates the many existing methods for information systems evaluation from a new point of view. Rather than the judging usability

for determining the exact value of an information system, evaluation methods are reviewed for their ability to support negotiation among the many stakeholders involved.

The practical contribution of this research to the selected field of research is also of importance. The case descriptions will provide reference material for municipal organizations. Many organizations have difficulty in realizing infrastructures. The cases provide examples of both successful and unsuccessful attempts to reach agreement among stakeholders. Furthermore the conceptual model of multi-actor decision making will provide a framework for planning and management of infrastructure decisions.

Qualitative research always raises questions about the generalization of the research findings. The interpretative point of view implicates that no assumptions can be made regarding the existence of an objective reality which can be discovered by researchers and replicated by others. Our knowledge of reality as human actors is almost entirely socially constructed. Nevertheless the last few years several researchers have shown that qualitative research can make contributions to the field of IS-research [BO87][WA94]. However, this requires considerable social and analytical skills from researchers.

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