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MANAGING THE INFORMATION SYSTEMS RESOURCE IN HEALTH CARE
Findings from two IS projects

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Jarmo Tähkäpää

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1 INTRODUCTION

1.1 Background

The goal of this thesis is to find the key management factors in the health care information systems (IS) projects in order to improve the implementation, initial use and development of IS in public health care. The challenge for the management is to find those strategically essential resource areas in which it has to focus on IS management to get the most out of the benefits of the system and enable IS to positively contribute to the performance of the organization. The requirements for acquiring and developing IS use should be evaluated at the start of the IS project.

Health care has always faced challenges in different forms, such as epidemics, wars, new diseases and demand for more effective treatments. The modern changes in the environment, like industrialization and urbanization, have formed different kinds of problems in the form of, for example, social inequality, increased criminality and medicalization (PricewaterhouseCoopers 2002; The European Health Report 2002). From that perspective it is nothing new that health care today also has to struggle to find new ways to overcome the problems it is facing. It has always been and probably will be in a more or less challenging situation.

Although the current changes and challenges include similarities to those of earlier decades and centuries, there are many new, previously inexperienced trends that have emerged, particularly with the increasing use of technologies. The challenges described above have mainly concerned the medical and health areas, which are natural challenges for health care and where the skills to handle them already exist, but the modern changes are challenging the area from a more or less new and somewhat strange direction (Grimson, Grimson & Hasselbring 2000; Saritas & Keenan 2004). Health care has to face the rapid development of technology, competition, new business-like organization structures and thinking, strategic management, etc. (Schwartz & Cohn 2002), and this will increase the demand for new skills and knowledge in the area (France 2000). Health care also seems to be losing its special status as an independent and separate industry, which does not concern the changes in other industries.

In the Communication on the development of Public Health Policy (2003) the EU has defined following challenges facing the Member States: "*Health care systems in the Member States are subject to conflicting pressures. Rising costs due to demographic factors, new technologies and increased public expectations are pulling in one direction. System reforms, greater efficiencies and increased competition are pulling in another. Member States must manage these conflicting pressures without losing sight of the importance of health to people's well-being and the economic importance of the health systems."*

These new and, in a way, modern internal and external factors are forcing health care organizations to seek new solutions in an unfamiliar environment. Some of these new solutions are presented further in the Communication. "*Computerization and networking, including the implementation of health care telematics, may help reduce health costs, particularly in relation to the management of health care.*"

Re-organizing functions and processes, new strategies, information systems and management issues is playing an important role in the effort to increase effectiveness and efficiency. The WHO has found four trends in organizing health services in Europe (The European Health Report 2002, p. 4-5):

1. *Countries are striving for better balance sustainability and solidarity in financing. Especially in the Western countries the solidarity is kept at a relatively high level.*
2. *There is an increasing trend towards strategic purchasing as a way of allocating resources to providers to maximize health gain. Those are e.g. separating provider and purchaser functions, moving from passive reimbursement to proactive purchasing, selecting providers according their cost-effectiveness. Effective purchasing is based on contracting mechanism and performance based payment.*
3. *Countries are adopting more aggressively updated or new strategies to improve efficiency in health service delivery.*
4. *Effective stewardship is proving central to the success of health system reform. This role (health policy, leadership, appropriate regulation, effective intelligence) is usually played by governments but it can also involve other bodies such as professional organizations.*

The role of strategic planning is going to increase according to these trends. The strategies should be able to focus on such issues as efficiency, better performance and competition for finance. The role of government is central, but other organizations can also be involved in the strategic planning - especially the local and organization-specific strategies that stress that local resources are needed.

PricewaterhouseCoopers Ltd (PWC) (1999; 2002) has defined three forces and four trends, and their implications, that are going to change health care by the

year 2010 (Figure 1). First, the increased use of technology is going to have an effect on the increase in customers' knowledge and is going to increase health care consumerism. Patients are getting more information on health issues and have more money to buy health services. This challenges health care staff to develop market thinking and branding. The second force is the ability of health care organizations to internalize and utilize e-business. Health care organizations have been slow to adopt more cost-effective ways of action. However, the health care sector has to follow a "traditional" way in internalizing for example Internet. The organizations have to start from information sharing and go through operational and financial interaction to medical management. The third force is that advances in genomics and biotech are going to change the shift in health care from cure to preventive care.

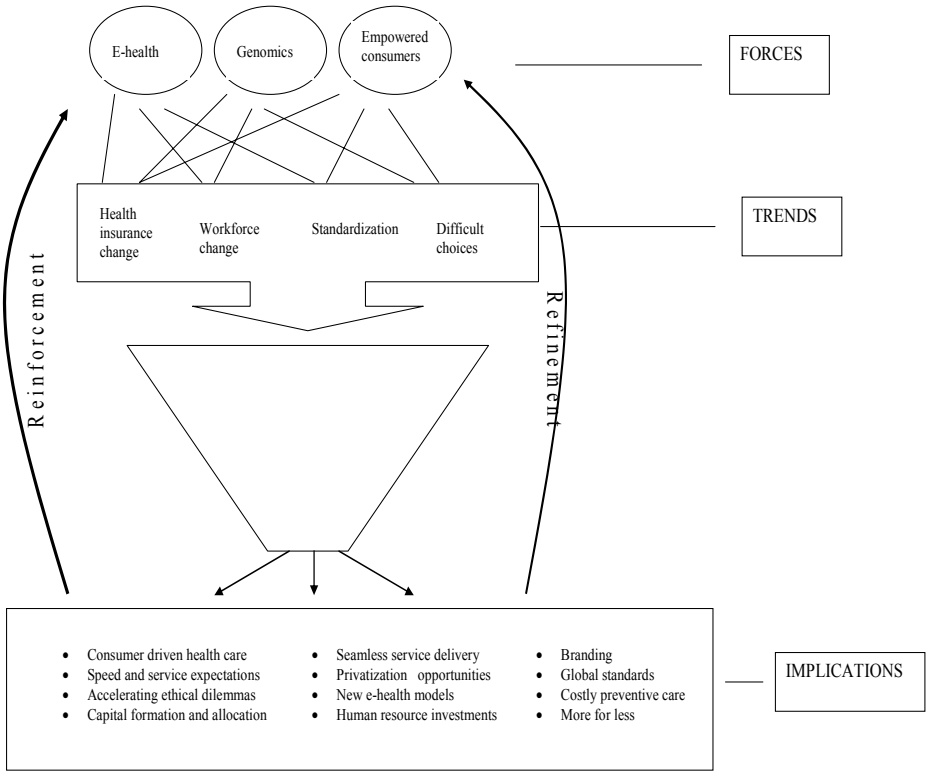

Figure 1 The forces, trends and their effects to health care by the year 2010 (PricewaterhouseCoopers 1999).

Out of the three forces, PWC has defined four trends: 1. Health insurances and financing are going to increase while the services in public health care are going to decrease; 2. The increase in customers' information needs and demands are

going to result in more standardized processes in health care - there is going to be a "cook-book" for citizens. The administration is the first and easiest to standardize, but as the standardization of rate payment and other administrative systems proceed it will also set pressure for clinical standardization; 3. Health care staff have to adapt to the increase in technology and to more empowered customers; 4. The increase in aging, technology and consumerism will force decision makers to make hard decisions. At the moment the decisions are about how much to pay for pharmaceuticals but in the future how much lengthening the patient's life or quality of health will cost will also be included (PricewaterhouseCoopers 1999; 2002).

There are several implications from the forces and trends, as can be seen in Figure 1, where the role of IS and the increased need for information in general is emphasized. The change from a traditional and bureaucratic organization to a more dynamic business organization with branding, cost containment, cross-functionality, customer focus, etc., will evidently change the sector.

One more trend that is increasing the demands on health care is the emergence of medicalization. The concept of medicalization was introduced by I.K Zola in 1972 (Zola 1972). It emphasizes the transfer of social problems in the area of medicine. Medicalization claims that some interest groups with an interest in ill health try to exaggerate anxiety about diseases and potential diseases so that healthy people seek unnecessary medical products and services (Conrad 1992). Examples of phenomena that are medicalized include birth, youth, old age, death, alcoholism, obesity and dyslexia. The reasons for medicalization can be regarded as clinicians striving for power, the increase in medical information and generalization of technology, and the humanization of society (Rintala 2003).

Thus medicalization is increasing the pressures on health care with people who don't necessarily need care. Some of the consequences are an increase in health expenses, a reduction in individual responsibility, a reduction in the responsibility of society and forgetting the solution to comprehensive problems (Rintala 2003).

These examples highlight the fact that health care has to adopt new ways to overcome the problems facing it now and in the next 15-20 years. The gap between the demand for health care from an increasingly well-informed patient and expectant public and the ability of governments and health care organizations to meet this demand is widening all the time. Two major driving forces behind the need to change are efficiency and cost-effectiveness, which have to balance between quality and cost-containment (Grimson et al. 2000). With the existing resources, it is difficult to even maintain the current level, not to mention improving it. Haux et. al. see three dominant factors that will influence the development of information processing in health care in the near future: the

development of the population, medical advances and advances in information (Haux, Ammenwerth, Herzog & Knaup 2002).

Information systems (IS) are seen as one solution to improve effectiveness in health care. Investments in health care IS have grown rapidly in the last decade and there are great expectations that IS will solve many problems, especially with regard to the diminishing resources (Sosiaali- ja terveysministeriön työryhmämuistioita 1995; Rodger, Pendharkar & Paper 1996; Raghupathi 1997; Devaraj & Kohli 2000; Menon, Lee & Eldenburg 2000; Winblad, Reponen, Hämäläinen & Kangas 2006).

However, the effectiveness and productivity of IS in private industries was already being questioned at the beginning of the 1980s (Strassman 1990; Brynjolfsson 1993). It was not clear that implementing information systems would improve productivity, even if the implementation process were conducted properly. There are always some processes which IS improves almost automatically, but the deeper effects which should create the ultimate and intended benefits are time-consuming and need thorough changes in both processes and organizational thinking (Dixon 1999; Devaraj & Kohli 2000; Menon et al. 2000; Lorenzi & Riley 2003). Strategically there is a need to take a more business process view of health care delivery and to identify the appropriate organizational and information infrastructure to support these processes (Grimson et al. 2000).

Although IS investments have grown in health care, the use and, especially, the effects of it on a larger scale are still in the early stages and changes are only starting to occur (Grimson et al. 2000). The broad objective of this thesis is to discuss the interaction of the health care IS investments and health care management requirements with their effects on the organization's activities. However, there are several variables which affect those areas (Barney 1986; Mata, Fuerst & Barney 1995; Andreu & Ciborra 1996) and thus the attempt is not to explain and exclude all those that end up as absolute effects of IS. The focus is more on understanding the demands the implementation of IS sets on health care organization, and its management in particular, and the expectations of IS by several stakeholders in public health care. After all, the eventual goal of the IS investments is to increase the performance of the organization without forgetting the quality.

An organization should also understand how IS investments interact with other resources and capabilities in the organization. This interaction should reach a level where IS can be used as a true tool to increase the organization's performance and quality (Feeny & Wilcocks 1998; Wade & Hulland 2004; Ravichandran & Lertwongsatien 2005). The second goal is to understand the stages of more effective IS management in IS projects and the kind of threats this involves. There are several problems and restraints before IS investments can

turn into real resources and affect the organization. These factors set high demands on health care management.

It is suggested in this thesis that the IS development usually follows an ascending curve, where every now and then, usually when larger changes happen, some descent in the development occurs. The focus of the research is on those descending phases and their causes. Hindrances and obstacles occurring in the descending phase can be defeated by understanding the special nature of the health care sector and the use of approaches that best fit the environment.

There are as yet no specific and embedded management theories or approaches developed for health care environment and they have to be borrowed and modified from other disciplines. In this thesis the theory of the resource-based approach will be used in describing the different resources in health care. The research approach of this thesis is qualitative.

1.2 Research environment

This research was conducted in the Finnish public primary health care environment, with a special focus on the IS management within it. The structure of the health care sector in Finland is introduced in this chapter so that the reader understands the environment and scope of management decision-making. Then, a short description of the cases of this thesis is followed to place the empirical environment in the health sector. Health care management and the cases are discussed in more detail in Chapters 3, 6 and 7.

1.2.1 Health care sector in Finland

The basic unit of Finnish health care is the municipality. The variation in the population of the different municipalities is from less than 1,000 to more than 500,000, and the average size is 11,000 citizens. The health care system is relatively decentralized since there are 448 municipalities in Finland, most of which have their own health centers. The decentralization has been possible since the importance of local decision making is highly regarded (Järvelin 2002). Recently, the relatively small size of the municipalities has given rise to discussion about the effectiveness of the service production and there are already some initiatives to incorporate some services or parts of services between municipalities. Health care services has been one of those sectors under consideration, since together with social care it creates the most expense in State and local budgets.

Health care is mainly publicly planned and free. In many ways, public health care has been successful and has a dominant status in Finland, which is one reason why the share of the private sector is still reasonably small. The two sectors are not very closely coordinated and their roles differ from each other. The role of the private sector is more to act as a choice in the areas where they are available and the competition between sectors is still non-existent (Järvelin 2002).

The system of financing public health care is based on taxation by both State and municipalities. The total health expenditure in 2003 was about 11 billion euro, which is 7.6% of GDP and below the OECD average. In 2002 the municipalities' share of total health care costs in Finland was about 43%, the State share was 17 % and the share of National Health Insurance 16%. Households covered about 20% and other private sources (e.g. insurance companies) about 4% of the health care costs. The cost of municipal-level health care was divided so that the customers' share was 8%, the municipalities' share 67% and the State's share 25% (Health Care in Finland 2004). The existence of several public funding sources has created some difficulties in the form of responsibilities - e.g. in covering loss of income during illness (Järvelin 2002).

The municipal system basically serves Finnish health care well. However, one problem is that the responsibility for care is devoted to numerous small units. With a small population, the know-how and experience in municipalities is not comparable to those large professional secondary care providers with their specialized care. This is one reason for the imbalance in professional and economic questions. Lately, especially in small units in rural areas, it has been difficult to employ qualified clinicians.

The economic crisis in the first half of the 1990s had a strong effect on health care. There were several cuts in health care budgets by, e.g., changing the State subsidy system, which cut the tax incomes in municipalities. However, despite the cuts, the area has maintained its quality and quantity reasonably well. In fact, the productivity actually rose after a long period of reduction. The tight economic constraints and stronger economic incentives encouraged more effective use of the scarce resources. However, there were still considerable changes in effectiveness between the health care organizations in the municipalities (Räty, Luoma, Koskinen & Järviö 2002).

There were numerous new initiatives and programs started in order to increase the effective use and integration of the resources. One distinct feature among several others from the middle of the 1990s has been the ever-increasing implementation of information technology (IT) and the change in thinking that started to emphasize the management and strategic perspective. This has probably been a new feature in health care in most European countries.

The drive for effectiveness and quality has launched several projects in the health care sector (C.f. Saranummi, Kivisaari, Väyrynen & Hyppö 2005). The projects quite often involve an IT function as a means of reaching the goals. The problem with the numerous projects is their loose integration due to a lack of feasible control, and there are several similar projects with basically similar content going on around the country. Thus there have been many State and Ministry coordinated projects and strategies since the middle of the 1990s that aim to standardize certain areas in health care information technology and avoid the fragmentation of the development projects (Sosiaali- ja terveydenhuollon tietoteknologian hyödyntämisstrategia 1995; Hartikainen, Kuusisto-Niemi & Lehtonen 2002; Kuntien ja valtion yhteisten menettelytapojen ja koordinoinnin kehittäminen 2005).

1.2.2 Cases in this thesis

The first case is the Paimio-Sauvo (P-S) health care federation of municipalities in southwest Finland. The federation is a public health care organization owned by the city of Paimio and the municipality of Sauvo, and it takes care of primary health care services for the population of 13,000 in the area. The main health centre is located in Paimio with a smaller health centre in Sauvo. The number of employees is about 100, of whom eight work in the Sauvo health centre.

P-S acquired new electronic patient record (EPR) systems in 1996, including a network and hardware to replace the old manual system. The system covered the patient administrative and health information quite well but several independent but important clinical systems that were not integrated to the EPR still remained.

One of the starting points toward the growing interest in health care IS in P-S was several changes in State statutes that changed the health care service production responsibilities between the municipalities and the State in the middle of the 1990s. The new statutes allowed municipalities more freedom to organize their regional health services and only obligated the municipalities to organize the health services instead of producing them, giving a possibility to choose the service provider from outside its own health organization. This was expected to result in a new situation where public health service providers had to compete with the private and third sector in providing and selling services to the municipalities. With the new information systems, P-S was preparing to face that challenge and expected the system to offer better information on the services and their costs.

There were also some changes made in its organizational structure. The external and internal changes were documented in the organization's strategy and the role of the new system was emphasized.

The implementation of the system went fairly well, although there was some resistance because of the several simultaneous change projects. The experiences from the initial use of the system were satisfactory. However, after some further experience a need to develop the system emerged. The development plans had good grounding in the organization's strategy but the organization did not have the experience to develop an information systems strategy (IS strategy) to guide the long-term planning.

To solve this problem the organization decided to order an IS strategy from an external actor. Since there had already been contact between the Turku School of Economics and P-S, the co-operation started. The steering group for the IS strategy development project was established with members from the Turku School of Economics and the P-S management and staff. Two researchers from the Turku School of Economics performed the research.

The empirical information was gathered through 64 theme interviews, which were done in two separate stages. In addition to the interviews, information was also gathered in steering group meetings and several documents from the organization. The strategy development project took about 18 months and the results were documented and presented to the organization.

The second case in this thesis is an evaluation of an information system implementation project in the health department of the City of Turku. Turku lies in the southwest corner in Finland and has about 170,000 inhabitants, which makes it the fifth largest city in Finland. In addition to primary health care services, the health care department also produces special health care services for its citizens.

The information systems implementation project Primus was started in 1998 and aimed at moving the primary health care services from a manual patient record system to EPR. In addition to a new EPR, the main development projects included a new information network for all primary health care offices around the city (104), process renewal projects and some minor development projects like an intranet for the health care department and call center.

Turku health care department had two main partners in the Primus project. The teleoperator Sonera had a main responsibility in the project and acted as a system-integrator. The partnership was based on outsourcing a solution where Sonera delivered and maintained the main network infrastructure for the department. It also maintained the servers placed in its own premises and took care of uploading the application updates supplied by NovoGroup. NovoGroup was an EPR system deliverer and held responsibility for maintaining and developing the software.

There was lots of discussion and arguments about the rationality and costs of the Primus –project, especially amongst the city management and the Primus project management wanted to perform an evaluation with an external evaluator.

Turku School of Economics was chosen to perform an evaluation and a steering group was established with members from Turku School of Economics and the Primus project management. Two researchers from Turku School of Economics performed the evaluation research.

The evaluation research was divided into two parts. In the first part the process, responsibilities and decisions that had led to the selection of partners and certain solutions, and eventually to the implementation of IS, was evaluated. The focus of the second part of the research was on the cost of the project and the effects on different stakeholders and the organization.

The main information collection method used in the Primus evaluation was 40 theme interviews. In addition to the interviews there were two questionnaires for staff and customers. However, the results of the questionnaires served the customer more than this research and are not much included in this thesis. Finally, there were two group interviews and a half-day evaluation seminar for the stakeholders of the Primus project.

The evaluation took about one and a half years and the results were published in two separate reports in the Turku City publication series. The results were also presented to several stakeholders of the city health care department and external partners on a separate occasion.

1.3 Motivation for the research

Research in health and medical informatics started in Turku School of Economics (TSE) in 1997. Since then the area has become an important area in the discipline of information systems science in the university. Two dissertations and numerous articles, book chapters and conference papers have been published. The co-operation with the University of Turku and Åbo Akademi has been active and knowledge from other disciplines like medicine and nursing science has deepened the understanding.

At TSE, IS strategic planning and management has been the main research area of the discipline since its foundation. Knowledge in the area is high and also the research in health care IS in the discipline has also aimed in strategic IS issues, although also other research areas have since emerged - e.g. evaluation of health care information systems has been a strong area.

The motivation to start the research in health and medical informatics in general arose from the fact that health care organizations had started to increase IS investments in the middle of the 1990s (Raghupathi 1997; Hartikainen, Mattila & Viitannen 1999; Winter, Ammenwerth, Bott, Brigl, Buchauer, Gräber, Grant, Häber, Hasselbring, Haux, Heinrich, Janssen, Kock, Penger, Prokosch, Terstappen & Winter 2001; Hartikainen et al. 2002) in the hope of more

effective and higher quality service. The investments were considerable and the expectations were high (van Ginneken 2002). However, the organizations were more or less in a situation where they were forced to seek different solutions and IS seemed to offer a means to enhance effectiveness. Acquiring IS was an easy, though expensive, task to perform if considered only as a transaction or even an implementation project. However, unless an organization knows the phenomenon or innovation - like new technology - thoroughly and from the perspective of its own organization, it cannot use or manage it effectively (Blyth 1998; Edmondson, Bohmer & Pisano 2001). Thus it seemed that the problems in health care organizations mainly originated from inexperience in the planning, management and measuring effects of IS. Those areas together fit into the discipline of information systems science in TSE more than well.

The creation of an organization strategy together with an IS strategy requires skills that small health care organizations did not have themselves. Although most health care organizations had a clear vision of the direction the area is developing in, the visions of the organization strategy did not cater for the potential of IS. IS implementation causes and requires changes in the organization and presumes commitment to new strategies (Dixon 1999; Schwartz & Cohn 2002). Further, although the implementation of new systems could be argued for with regard to efficiency and rationality, the social and political pressure inside the organization could cause the opposite effect (Doolin 2004).

In competitive business organizations the connection between organizational strategy and IS was already understood few decades ago (Kriebel 1968; McFarlan 1971; King 1978; Earl 1989). However, despite acknowledging the importance of integrating organizational strategy and IS strategy, a gap between the two still exists. That gap is explained for example by cultural differences (Ward & Peppard 1996) and in health care this gap is emphasized since IS has had a minor role so far.

In the Turku area there are several middle-sized municipalities that have implemented information systems in their health care organization at roughly the same time and with roughly the same components. The P-S health care federation of municipalities was one of them. The similarity between the organizations offered the possibility to use and validate research results in other organizations in the area.

The implementation of a new system and the need to develop a strategy to develop it fitted well with the research tradition in TSE information systems science and the research project started. The goal of the first case was to create an information management strategy based on the organization strategy, which had already been developed about a year before.

After the first case there was a need to validate the results and gather new information. Thus another case was needed. The second case organization was

also in the early stages of using IS and was in pretty much the same situation as the first case. The second case was an evaluation research in which the emphasis was on understanding the decision-making process in IS acquisition and the effects of IS implementation on different interest groups. The second case also gave a wider perspective on IS implementation than just the management view, although it was one of the dominating perspectives in this case as well.

There were some central features in both cases that were under close scrutiny when the cases were started, but like in all research, new perspectives emerged. The common focus in both cases was the IS management and IS strategy issues, economic issues, supportive issues like training, technical solutions and connections to the IS suppliers. Then there were some more detailed case-specific issues. In Primus those were mainly outsourcing decisions and in Paimio-Sauvo the definition of new architectures for applications, data, hardware and network.

The approach of the thesis was gradually developing. The aim was first to develop a framework for health care organizations to help them develop their information management strategy, and the first case supported this goal very well. However, this goal was changed as the second case proceeded and it was noticed that although the IS strategy development perspective was important, there were some new and more detailed issues that were closely connected to management and strategy development. In the second case the IS implementation mostly included technical but also partly managerial aspects in which the questions of how to integrate the IS with other existing resources (and processes) and, further, what factors would cause the IS to become a part of the organization's core functions were forgotten. Similar concepts were already arising in the first case. The issue was discussed widely in private industries but the approach was new in the area of health care. To rectify this, organizations should first consider which resources are the actual core resources for the organization (Feeny & Wilcocks 1998). In a way, the organizations were satisfied if the information systems were implemented successfully and fitted the current work flow. The deeper impact and the factors that affected that impact were left aside.

1.4 Aim of the research

The discussion about the adequacy of resources in Finnish health care has been lively for some time. The repetitive theme in this discussion has been the scarce resources and the retrenchments done in the recession of the previous decade. However, productivity even increased with certain meters during the recession since the services were managed to maintain about the same level with

decreasing economical resources (Linna & Häkkinen 2004). However, studies of the effectiveness in health service delivery at the beginning of last decade show that there was considerable variation in effectiveness between service producers and the potential for finding new ways to increase effectiveness is evident (Räty et al. 2002). One result of this has been that the investments in health care IS have increased substantially during the last decade. The investments, like in any sector, are expected to increase effectiveness without compromising quality. However, IS alone seldom has a long lasting or sustained effect on effectiveness and quality (Barney 1991; Clemons & Row 1991; Wade & Hulland 2004) and those factors that affect their development have to be identified. Basically, those factors are pretty much similar in both public and private sectors, but the environmental factors that affect the development of those resources are considerably different in public health care. Thus the first goal of this thesis is to identify

> *Which are the key areas on which the health care management should focus in IS projects in order to ensure that the project will be effectively implemented and have a positive effect on the organization's functions?*

Public health care is a fairly new area in using IS in a wider perspective and the management of it is still developing. From the management perspective, the whole sector differs from the private sector in many ways. One difference is the number of stakeholders who steer the system, including city management and boards, which affects the management (c.f. Blyth 1998; Kumar & Subramanian 1998) and strong professions and stakeholders inside the organizations (C.f. Turunen 2001). Second is that the structures inside the organizations are complex, hierarchical and profession-based and have developed during centuries; thus they are difficult to change (Doolin 2004). To implement new, partly strange and complicated components may be difficult and there is a need to find new ways to introduce those components and discuss them between stakeholders. Third is the continual lack of money, which forces the organizations to choose the most optimal from several investment targets. The cost containments effects, quality effects and success of IS should be the better reason for the investments (C.f. Devaraj & Kohli 2000; Menon et al. 2000; Ziegenfuss Jr. & Bentley 2000; Wang, Middleton, Prosser, Bardon, Spurr, Carchidi, Kittler, Goldszer, Fairchild, Sussman, Kuperman & Bates 2003). The lack of definition of these factors is a hindrance in health care development toward more business-like and effective goals, and should be recognized and removed.

Thus to acquire the best benefit from IS it is important to identify the kind of barriers there are to its becoming one of the key resources and how those barriers

can be defeated so that IS can affect health care services. Therefore, the second goal of this thesis is to find

> *Which kind of issues management should emphasize in the key areas of the IS project to avoid barriers and ensure IS develops as one of the key resources?*

The levels from which the barriers and problems can be examined are strategic, tactical and operational (Winter et al. 2001). Strategic planning and management has been increasing in the public sector and has also been approved in health care (Schwartz & Cohn 2002). Thus the viewpoint of this thesis is also from the strategy and management level.

1.5 The framework of the study

Figure 2 presents the framework of this research. The Figure points out the different aspects of the study and their relationship. The resource-based approach is used as a base when discussing the resources in the health care environment. The theory offers a perspective on emphasizing the role and the importance of the different resources and their interaction in public health care, and the role of management in exploiting and developing those resources.

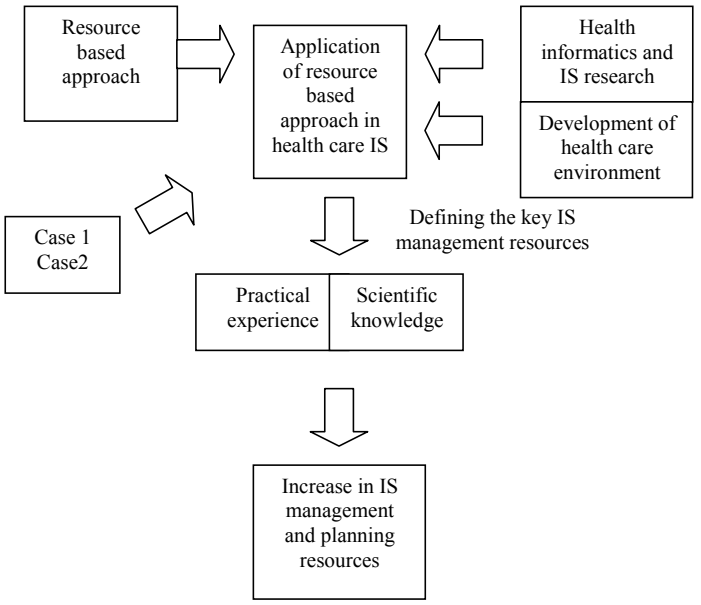

Figure 2 The framework of the study.

The research and development in health informatics, IS and the health care environment have effect on how the resource-based theory should be focused and which aspects should be emphasized in this study. The resource-based theory should give grounds for the identification of critical resources in each area. The focus of this study is on the management resources and their role and focus in the IS acquisition, implementation and introduction stage.

The cases give feedback from the industry and offer practical experience of how and which resources the management lacks or which resources should be emphasized. Feedback is also needed in confirming the applicability of the resource-based approach to the health care field and public sector in general, and how it increases scientific knowledge. The private and competitive sector theories and approaches are increasingly being used in the public sector. The results of the study should increase the knowledge of the management and planning of information systems in public sector health care.

1.6 Limitations of the research

The differences between public and private primary health care clinical operations are rather small, and this thesis discusses health care from the management perspective. Management of public health care as a public organization includes several features (Kohli, Piontek, Ellington, VanOsdol, Shepard & Brazel 2001) that are considerably different from private organizations. For example, the political dimension in decision-making, and the public sector regulations and restrictions in co-operation with private organizations have to be considered. Competitive bidding almost always precedes a bigger acquisition and makes the whole process different from the private sector. Therefore, it is necessary to impose limitations and this thesis only concerns public health care.

Primary health care in Finland is mainly provided by health centers and mostly concerns diseases that feature as large masses and low need for special operations. In addition to health services it offers services in health protection, prevention and dental care. The number of daily visits to doctors or other health care professionals is high, thus the amount of created and needed information is high. About 2/3 of doctor consultations take place in primary health care (Jakubowski & Busse 1998, p. 50). This makes it different from special health care where typical operations need specialists and more specialized equipments. The difference is in the areas of patient visits and the level of specialization.

Another difference is in the IS use in primary and special health care. At the time the information for this thesis was being gathered, the systems, like EPR's and the level of their implementation, varied between primary and special health

care (C.f. Winblad et al. 2006). It would be impossible to say that the results concern all the health care organizations, including the special sector. This is also a reason for keeping the private sector out of this research.

However, primary health care has several important confluences with special health care that affect the IS planning and management, so special health care is also considered in primary health care IS management.

The information systems mentioned in this thesis only include administrative systems like EPR. Those are the ones that affect health care organization most at the moment (Winblad et al. 2006) and also have the biggest influence on management issues. Thus all clinical systems and systems that are used during treatment on a ward level are excluded from the discussion in this research.

The discussion in this thesis emphasizes the management point of view with regard to IS development and IS projects. There are several other levels, like users and their satisfaction (van Ginneken 2002; DeLone & McLean 2003) or customers (Kohli et al. 2001). However, the management view covers a wide range of issues and offers a good perspective on IS development and projects. The management decisions affect a number of areas in the organization and can be regarded as a fundamental area in IS development. Another reason is the tradition in our discipline in our university, which has been in the area of strategic IS management. This research widens that perspective to a new area of the public sector.

1.7 Structure of the thesis

This structure of this thesis is as follows. Chapter 2 presents the methodology of this thesis and discusses the generalizability, reliability and validity of this thesis. A general picture of health care in Finland and the role of information systems in it are described in Chapter 3.

The approach used in this thesis is presented in Chapter 4. Chapter 4.1 discusses different approaches to understanding health care IS and strategic management, and lists nine possible approaches. The approach of this thesis towards its relationship with strategic management and information systems is presented in Chapter 4.2 and some criticism of the approach is highlighted.

Chapter 5 presents the framework of the thesis and the components of the framework is discussed in Chapters 5.3 - 5.6.

Chapters 6 and 7 present the empirical findings of the research. The case organization, the research project conducted and data collection is presented first and the findings are discussed based on the components described in the framework of the thesis. Chapter 8 concludes the empirical findings.

Chapter 9 gives the conclusions and limitations based on the research and further research is suggested. The structure of the thesis is presented in Figure 3.

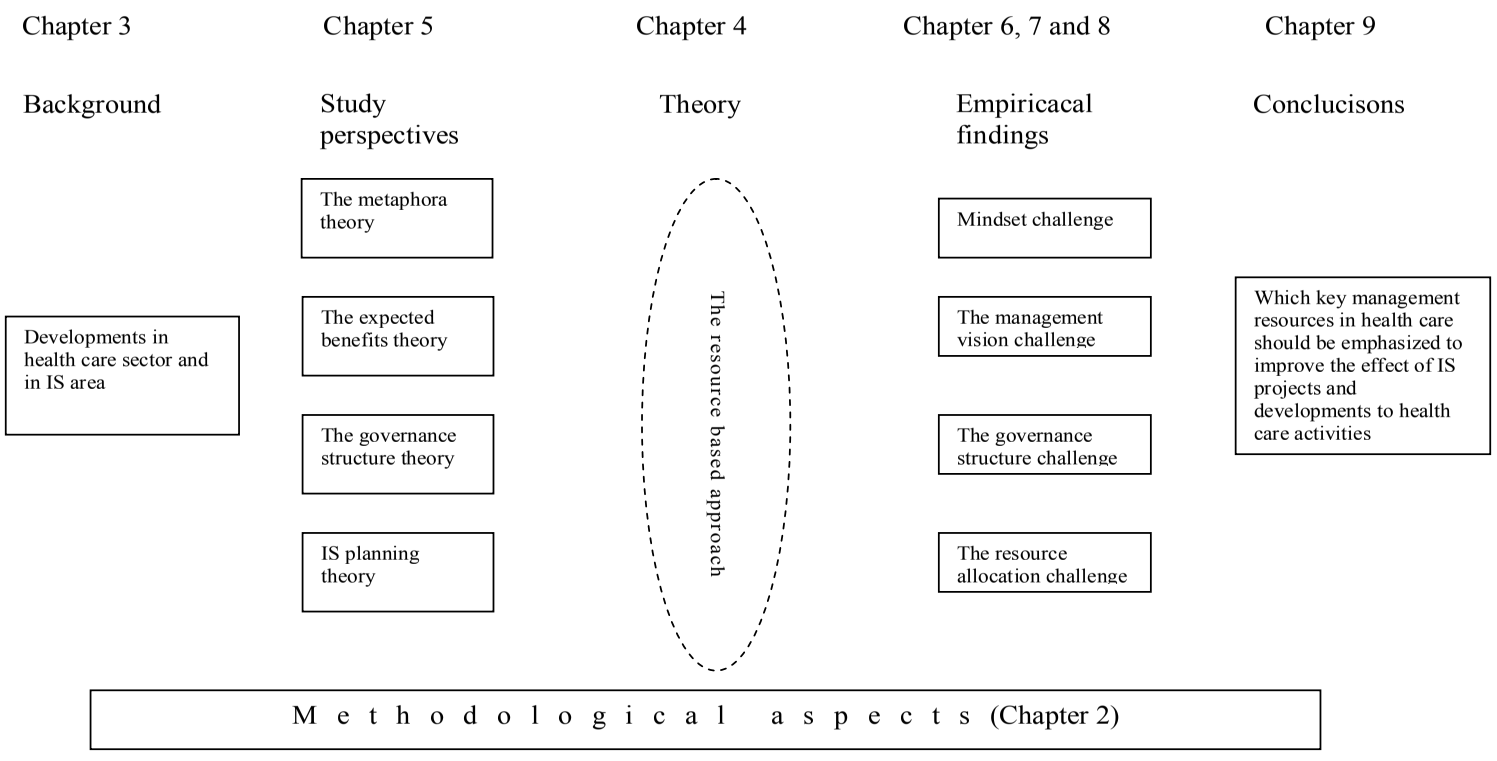

Figure 3 The structure and content of the chapters of the thesis.

2 METHODOLOGY

This section introduces the selected methodology and its adequacy and application for the cases, and for this thesis. First the selection of methodology is presented in light of research philosophies and some comparison between different paradigms in the social sciences and health sciences is briefly discussed. After that the action research methodology is presented. The use of the chosen methodology is argued in Chapter 2.3. In the end of this chapter the generalizability, reliability and validity of this research is discussed.

2.1 Selection of methodology

The epistemological aspects of social science, including information systems, are concerned with the assumptions about how one might begin to understand the world and communicate this as knowledge to other human beings. The assumptions concern issues like what forms of knowledge can be found and in what way the researcher can regard the knowledge as being true or false. By its nature, knowledge can be hard and such that can be transmitted to tangible forms like numbers and statistics, or softer and subjectively based on personal experience of the phenomenon (Burrell & Morgan 1979).

In social research there are numerous research perspectives that operate concurrently. These disciplines have their own schools and each have their metatheoretic assumptions, research methodologies and adherents (Orlikowski & Baroudi 1991).The main stream of epistemology in the social sciences is often divided into positivist and anti-positivist research. Positivistic thinking stresses social structures and social facts, and tries to test correlations between variables. Anti-positivism emphasizes social construction and meanings, and is more concerned with observation and description and, at best, generating hypotheses. Anti-positivistic research features subjective observations as positivistic rather than objectivistic. Positivists use quantitative and hypothesis testing methods while anti-positivist use qualitative methods and hypothesis generation, (Hirschheim & Klein 1989; Silverman 1998) although there are several research papers that discuss and support the combination of these two methods (Kaplan & Duchon 1988; Yin 1994; Chan 2000).

The dominant approach to information technology studies has been based on the positivistic experimental ideal of research (Kaplan & Duchon 1988).

Orlikowski and Baroudi (1991) claim that the range of research philosophies in information systems research is not as evident as in other social sciences. In addition to the two philosophies above, they present two more: interpretive and critical research. Interpretive research closely corresponds to the anti-positivistic view and assumes that people create and associate their own subjective and inter-subjective meanings as they interact with the world around them. It does not try to generalize the research setting to a population but tries more to understand the deeper structure of a phenomenon (Orlikowski & Baroudi 1991). The central idea within critical philosophy is the belief that social reality is historically constituted, and that human beings, organizations and societies are not confined to existing in a particular state (Chua 1986). The epistemological belief of the philosophy is that knowledge is grounded in social and historical practices (Järvinen & Järvinen 2000).

The research in health care has its own old and established philosophies. Turunen (2001) divides health science into nursing science and medicine. In nursing science the dominant view has been positivistic, although the phenomenology-hermeneutic approach has lately been increasing. The positivistic approach in nursing science is mostly due the positivistic research in medicine. The dominant methods in both sciences are objectivistic and quantitative, although qualitative methods have also become more popular, especially in nursing science.

The spectrum of different research philosophies, disciplines and paradigms makes social science-based IS research, and the selection of research methodology in the positivistic health care area in particular, a challenging task. The research should satisfy the audience of both sciences in such a way that the results can also be accepted from a methodological viewpoint. In addition, there is no clear and established paradigm for use in IS research. The research in IS has concentrated on theories and models, and even more on the practice of IS. Therefore, the selection of methodology has been considered carefully.

This research discusses how the increase in implementation and use of IS and focus on certain IS management areas can contribute to both performance and quality in health care. The general thinking in many service sector industries and, especially, in the delicate health care sector is that increasing effectiveness means a reduction of quality. It may, for example, be seen in the current situation in Finnish health care, where the number of staff has been reduced but the quality of care still seems to be good. However, the long-term quality of care has suffered from the situation and health care is under heavy criticism and other solutions have to be found.

The aim of this work is to understand the factors that can contribute or hamper the development of IS to become a solution to both lack of quality and performance, especially in the early stages of IS implementation and use. The

research is especially concerned with the organizational and individual aspects in adopting the IS, which includes many uncontrolled and unquantifiable phenomena. Understanding the current development of the external and internal environment, and the communication of them is necessary in the case of integrating the technical area of IS and human health care. Therefore, the research approach has to be such that it is possible to understand the individual, group and organizational social relationships in their sometimes messy and uncertain environment (Kaplan & Duchon 1988; Skinner, Tagg & Holloway 2000; Trauth 2001). The anti-positivistic view, which points to social constructions as well as subjective and inter-subjective meanings, is more important than social structures and facts in this kind of research. Therefore, the research approach of this thesis is anti-positivistic and interpretative.

The research method used in anti-positivistic or subjective research is qualitative (Silverman 1998). Subjective research methods are also dominant in this thesis. Due to lively epistemological discussion about the distinction between anti-positivism and positivism, the distinction between qualitative and quantitative research has been strong. There are also several opinions that emphasize the combination of these methodologies. However, even though there are several papers in which qualitative and quantitative methods are combined, there are seldom reports on the methodological rationale or details. One reason for this is the failure to discuss how qualitative methods can be combined with quantitative ones (Kaplan & Duchon 1988).

Collecting different kinds of data from different sources with different methods gives a wider range of coverage, which may result in a fuller picture of the unit being studies than would have been achieved with using only one method (Kaplan & Duchon 1988). Using multiple methods increases the robustness of the results because the findings can be strengthened through the cross-validation achieved when different kinds and sources of data converge and are found congruent (Jick 1979). This research also includes both qualitative and quantitative data, although qualitative data is dominant. The quantitative data is used to complement and strengthen the results from numerous interviews and to give a wider scope for the phenomenon being studied.

2.2 Action Research

The term ‘action research’ has been in use in academic literature at least since the latter part of the 1940s. Similar or equivalent terms, like action method, deep action method, interaction research, role research and drama research, were already in use earlier (Baskerville & Wood-Harper 1998; Dash 1999). The approach was used in research where the action was carried in groups and the

aim was to develop the action in joint responsibility. The typical features of the action research at that time were democracy, participation and simultaneous influence on the development of science and social change (Carr & Kemmis 1983). Since then, action research has been used in vide variety of domains - e.g. agricultural development, appropriate technology development, educational reform, organizational change and development, public health, etc. (Dash, 1999).

In the IS field action research started to gain popularity in the 1960s, but, after some critical periods, not until the late 1970s on any larger scale. After that, the IS action research emerged as a distinct application for action research (Baskerville & Wood-Harper 1998).

From the philosophical point of view, action research finds support from pragmatism and dialectical materialism, and from the methodology point of view it belongs to qualitative methods (Järvinen & Järvinen 2000). The method can also be used in quantitative research but it is believed to be more appropriate in a qualitative research environment (Benbasat, Goldstein & Mead 1987; Lukka 1990; Turunen & Talmon 2000).

The knowledge creation in action research includes participation in practice, knowledge and theory (Avison, Lau, Myers & Nielsen 1999). The method is the production of knowledge to guide practice, with the modification of a given reality occurring as part of the research process itself. Within action research, knowledge is produced and reality modified simultaneously, so that both are occurring due to the other (Järvinen & Järvinen 2000).

In this research the starting point was that the organization had certain areas in which they needed better information. On the other hand, the researchers were in a quite new and unknown research area. In general, the health care IS research was growing in importance since IS was increasingly starting to be used in health care. Thus the starting point was the need to produce new information and knowledge for the practical and theoretical arena. The aim of the research was to produce knowledge for health care practice and the health care IS theory field; thus it followed the method of action research. The theory and practice was intertwined.

The researcher can be involved in an action research study in different ways (Baskerville & Wood-Harper 1998), but the basic feature of the researcher's role is to participate in and influence the activities of the organization by trying to find practical solutions and bring added value to scientific frameworks (Benbasat et al. 1987). It is an iterative process involving researchers and practitioners acting together on a particular cycle of activities, such as problem diagnosis, action intervention and reflective learning (Avison et al. 1999). Susman and Evered (1978) describe action research as a cyclical process with five phases: diagnosing, action planning, action taking, evaluating and specifying learning. These cycles continue through several rounds (Järvinen & Järvinen 2000).

Berg (2004, 198) defines the basic action research process in a more traditional research process way. According to him, the process follows a spiraling progression and includes four phases:

1. Identifying the research problem
2. Gathering the information to answer the questions
3. Analyzing and interpreting the information
4. Sharing the results with the participants.

Berg's definition fits the process of the action research in this thesis well. The problem was first identified in the steering group and from the initial interview round. After the information analysis the further interviews were executed and the scope of the research was specified further. After the final analysis and interpretation was done the results were shared with the different stakeholders in the organization, like management, staff and other health care organizations.

The interaction with the organizations was strong during the research. In addition to the steering group meetings, the researchers were in contact with different members of the organization almost daily. This improved the analysis of the gathered information in that certain issues could easily be checked and feedback received, and some comments about the initial results could be offered.

There are also some limitations in action research that emerge from modern goal-directed society. Even in scientific research the practical impact is increasingly stressed and the research funding very often comes from some instance other than the research organization (Turunen 2001). Concentrating on the action and the practical results themselves is often done at the expense of rigid methodologies, research procedures and techniques (Kock, McQueen & Scott 1997). Puhakainen (2001, 36) refers to Orlikowski and Baroudi (1991) and Kock et al. (1997) in describing three main weaknesses of action research emerging from these features (Puhakainen 2001):

- Contingency of the research findings (validity of the research outside the research organization).
- Low control of the environment (low ability to test and produce strong theories or build models based on solid evidence).
- Personal over-involvement (personal biases in the conclusions).

Research traditions in health care present predominantly positivistic and quantitative research (Turunen 2001, 47-53). Qualitative research methods like action research, ethnography and case study method, even though using both qualitative and quantitative material, have not been popular. However, the research methods in interpretative sciences like the social sciences and methods in positivistic sciences like the medical sciences concentrate on different phenomena. The appropriate research method is dependent on the research topic and research question addressed (Avison et al. 1999). Research on organizational phenomena and relationships requires a different approach to that which points to

statistical, value-free and logical methods. Action research bases its scientific legitimacy on philosophical traditions, which are different from positivistic science (Susman & Evered 1978).

The goal in both cases in this thesis was to influence the organization so that it could more effectively develop and use IS in improving the quality of the care. Understanding case organizations and their activities and processes was therefore the first essential task. As such, this goal could be achieved using various methods. However, action research enables the researcher to be involved in the action in an organization as a member of it and solutions are made together with the organization's staff and management. Action research fits well with situations where the organization is in the middle of some change process since, as an active actor, the researcher can get into the change process (Benbasat et al. 1987). This was realized in both cases since the effects of the implementation were still going on in both.

The responsibility for the actions is shared between members of the organization and the researchers. For example, in ethnography the researcher acts more as an observer and the responsibility is not shared. Since the purpose in both cases was to influence the activities in the organizations, the commitment of the staff and management was relevant in exploiting the results and recommendations of the research.

Some of the threats were realized in the research. The cases were somewhat different in size and research setting. Thus strong theoretical results could not be drawn and the results remained on a quite general level. However, the viewpoint of this research is that strategies are not usually very detailed at the strategic management level. The case organizations were also in the middle of change, which was quite organization-dependent (especially the second case), and the results can be difficult to validate outside the research setting. The first case was a more general case, and the results can be better generalized.

2.3 Rationalization of methods

This chapter discusses the rationale for the use of the selected methods. A more detailed description of the methods of collecting the empirical information is presented in Chapters 0 and 7.

The methods used in the two cases in this thesis are quite similar. Both included qualitative data gathering in which the large quantity of theme interviews were the main data gathering method. In both cases steering groups were established, which also offered information in the form of discussion and comments about the progress of the research.

Steering group meetings were held regularly and guided the research, and was also a important source of information. In addition, group interviews and a seminar session were held in the second case, which mainly presented observation since the researchers were in the role of giving the topics for discussion without trying to participate or steer the discussions in any other way.

In the second case the information from the interviews was complemented with two quantitative questionnaires. The first questionnaire focused on the customer knowledge and experience of the IS project in the city. The second focused on the user satisfaction with the execution of the IS project and experiences of the implemented patient record system. The questionnaires were mainly used as complementary data to the qualitative material.

The aim of using qualitative methods is based on the fact that the need to understand the environment and operational principles of public health care was essential in order to be able to answer the case organizations' demands about the results and the demands of the research questions in this thesis. The research on health care IS was still in the early stages in our university and the knowledge of the industry was still modest.

Järvinen and Järvinen (1999, p. 92) uses twelve aspects originally defined by Kvale[1] to understand the nature of the qualitative research interview. The aspects are: 1. The interview is focused on the interviewees' experiences in her/his life; 2. It focuses on understanding the significance of a phenomenon through the interviewees' experiences; 3. It is qualitative 4. It is descriptive 5. It is specific; 6. It is free from presuppositions; 7. It focuses on certain themes; 8. It allows ambiguity; 9. It allows changes; 10. It depends on the interviewers' sensitivity; 11. It happens in interaction between individuals; 12. It might be a positive experience. Even though all of the aspects define the approach to qualitative research in this thesis well, the emphasis of the role of the interviewee and her/his experiences of the environment, artifact or phenomenon should be raised. The interviews were focused so that the interviewee could answer according to her/his experience of the effects of IS or the process of an IS project. The questions were "personalized" to each interviewee group according to the environment and tasks of the group, but still remained a similar basic structure.

The interviews can be divided into open/ informal interviews, semi-structured/theme interviews and a structured/formalized interview, depending how fixed the order of the questions is. In open interviews the order of the questions is free and the interview follows the themes arising during the interview; the answer to one question can generate the next question. The aim of the open interview is to understand, often new, phenomena widely and the interview often resembles a free discussion between interviewer and interviewee.

[1] (Kvale 1983).

The selection of interviewees is done carefully and those who are chosen are usually a few experts in the area (Järvinen 1999, 153-155; Hirsijärvi & Hurme 2000, 43-48; Järvinen & Järvinen 2000, 91-93).

The structured interviews present the opposite to open interviews. In structured interviews the sequence and the form of the questions is fixed and the interview is done in the same way with all the interviewees. The interviewees are chosen beforehand and the group can be more heterogeneous than in the open interview. The answers are divided into the different classes before the interview and the interviewer has an easy task to choose the most suitable class. Compared with the open interview, the structured interview is fast to conduct and easy to analyze because of the classes described beforehand (Järvinen 1999, 153-155; Järvinen & Järvinen 2000, 91-93; Hirsijärvi & Hurme 2000, 43-48).

The theme interview is in between the two previous interview forms. The term theme interview does not exist with similar names, but the same type interviews are also done elsewhere (Hirsijärvi & Hurme 2000, 47-48). In this thesis the term theme interview is used.

In the theme interview the questions can be selected beforehand and are the same for all the interviewees, but the answers are not fixed to any classes and the interviewees can answer with their own words. The interview proceeds according to certain themes and questions, the wording of which can be changed by the interviewer. In a way, the semi-structured interview combines the good sides of the open and structured interview (Järvinen 1999, 153-155; Järvinen & Järvinen 2000, 91-93; Hirsijärvi & Hurme 2000, 43-48).

The theme interviews in this thesis follow the four basic features Hirsijärvi and Hurme (2000, 47) present based on the book by Merton, Fiske and Kendall[2]. First, it is known that the interviewees have experienced certain conditions. Second, the scientist has studied the important parts, structures, processes and entities of the phenomenon in advance. Third, according to the analysis in the second phase, he develops an interview framework. Fourth, the interview is focused on the subjective experiences of the conditions the researcher has analyzed.

The theme interview is used a great deal in pedagogics and the social sciences since it equates well with the principles of qualitative research. However, the theme interview is not only a method in qualitative research, but it can also be used in quantitative research. It is possible to calculate frequencies from the material, which can then be formulated to the needs of statistical analysis, and the results can be analyzed in different ways. In theme interviews the themes are decided, but the structure and sequence of the questions is not decided (Hirsijärvi, Remes & Sajavaara 1997).

[2] (Merton, Fiske & Kendall 1956).

The theme interview was chosen as the main information gathering method since the aim was to find answers to certain areas of the health care and IS function and its effects. The structure enabled a focus on certain themes but since the focus group of interviewees was wide, it also enabled changing the questions within the theme to better fit a particular group. But keeping certain themes consistent throughout the whole interview process helped in the analysis. It was easier to connect and group certain issues under the themes, even though the interviewee group was different. However, since the groups were heterogeneous in some cases the interviews had to include different themes – e.g., themes for nurses, IS suppliers and a Ministry can't be developed in the same way as the themes between doctors, nurses and management.

The analysis was done so that certain salient and repeated issues were picked up from each theme. The analysis was usually done right after the interview so that the interview was still fresh in the interviewer's mind. This helped in recalling non-verbal signs that were not possible to write down on paper. Recording the interviews was tried in the second case but it did not bring any additional benefits and was not used further. The tapes offered a means to check certain things afterwards but they were not used since the analysis of the interviews was done immediately after each interview. In addition, there were more than one hundred interviews, so transcribing the tapes onto paper would have been an enormous task.

The questionnaires used in the second case offered information from a lower and more concrete level than the management level, and the concrete effects on the users and customers were studied. The advantages of the questionnaire are that it offers a means to gather data from a wide audience when the number of issues studied is reasonably low and the development of it can be even more rigorous than with the interview form; the questions are exact and there are only a few answer choices on the form. Another advantage is that the respondent can choose the time when she/he answers the questions (Järvinen & Järvinen 2000, 155). Furthermore, there are more IS tools with which to analyze the data.

The downsides are that the questionnaire can only be conducted once and the researcher cannot be sure if the respondent has understood the questions correctly (Järvinen & Järvinen 2000, 155). The questionnaire was merely used to complement the information gathered from the interviews, and the data from them served the case organization more than the aims of this research. However, the questionnaires gave important information on how the IS project process was informed and how the communication was operating between the health department management, staff and customers. The communication between stakeholders during IS projects is an essential part of the management task.

2.4 The generalizability, reliability and validity of this research

Without proving that the procedures used in the research were reliable and the conclusions are valid, there is no use in presenting the results to the audience (Silverman 2000, p. 175). Generalization is another attempt to prove that the research results can also be used in other cases. It is an attempt to give the research more value when the results can be diffused. In this chapter the three concepts are presented at the conceptual level and the generalizability of this research is discussed. The validity and reliability is then discussed on the basis of McKinnon's (1988) categorization of the threats and ways to avoid the threats for reliability and validity.

Generalizability means the usefulness of a defined theoretical construct outside the environment in which it is developed. IS is a highly applied and vocational area, and the generalization of the research results and theories through relevance and practicability is important. Because IS is applied and vocational research field generalizability is a crucial aspect in evaluating the impact of most IS research findings, practioners can make decisions based on the general case and researchers can relate their new research findings to this generalized case (Baskerville 1996).

Turunen emphasizes the increase in practical research. Modern society values research which has a straight effect on practice and funding for the research is increasingly originating from firms or other instances rather than the budget of the research organization (Turunen 2001, 107-111). This is probably going to affect the generalizability of the research findings since the research is increasingly related to a certain firm or group of firms.

On the other hand, Robey and Markus (1998) emphasise the rigor and relevance that research should be financed by a practical organization in order to achieve the practical implications. However, Galliers (1995) states that the research should not follow the latest fads, to which the results will not be relevant, but the researchers should be proactive and should take account of the views of the practitioner community.

Generalizability among practitioners is more acceptable than in academic research. Practitioners are often forced to limit their experience to a single problem in their operational environment. In the academic field the use of a previous experience in a new setting is only acceptable if the previous experience represents a variety of situations (Baskerville 1996).

Some researchers doing qualitative research say that generalizability is not even a goal in a single or intrinsic case study. In a qualitative study it is seldom possible to select a representative sample of cases, since the sample size would be so large that the information gathering and analysis with traditional qualitative methods would be impossible. The question remains how do we know how well

the findings from a single case, or even a few cases, represent all of the population from which the case was selected (Silverman 2000).

In this research the research environment has been public primary health care. The cases were selected on the basis on which the most of the cases in qualitative research is selected: they were available. However, they also had certain well-structured and defined areas to be solved. There are a few items that support the generalizability of this research. First, health care, and especially public sector health care, is quite strictly regulated from the State level. Thus the operating principles, structure and services are very similar and the general operating environment varies little. Second, the role of IS in public primary health care has increased simultaneously, mostly during last ten years, and the environmental circumstances (public sector economy, health status, advances in medicine, etc.) have been the same. Third, the research has leaned on multiple information gathering methods and multiple levels of informants. In addition to information from inside the organization, the information was gathered from different organizations at the State level to clarify the current state and further developments in health care.

Reliability of the research means the extent to which the results of several researchers studying the same phenomena with similar purposes produce approximately the same results. The concept of reliability is closely related to universality, repeatability and, consequently, falsification (Baskerville 1996).

Whereas the results in quantitative research are open to both researchers and readers, the results in qualitative research - especially if based on observations - are not observable to others. The reader has to trust what the researcher has written in the report (Silverman 2000). Turunen (2001, 107-111) posits that the reliability and validity of qualitative research can be evaluated similarly to quantitative research, but there is no consensus about the criterion of the qualitative research, as there is in quantitative research.

Validity means the extent to which the observation measures what it is supposed to measure. It means that the construct, model or concept exactly describes the reality. Validity can be divided ino internal and external validity. Internal validity is the extent to which the causal analysis or explanations offered by the theory reflect the reality at the moment of observation. External validity is the extent to which the causal analysis and explanation by the theory can be applied to similar phenomena (Baskerville 1996).

McKinnon (1988) has defined the threats to validity and reliability in field research. Her article does not question the use of field research but attempts to explain how to get rid of the problems in field research. She has defined four threats:

1. The observer-caused effects

- The presence of the researcher affects the behavior of the participant under observation. The results have not developed in a natural setting.
- The researcher can be regarded as a “management spy”.

2. Observer bias
   - A tendency to observe the phenomenon in a manner that differs from the “true” observation in some consistent fashion”. The concern is what the observer sees and hears or thinks he hears or sees.
   - Observer bias can emerge in any of the registering or interpreting stages.
3. Data access limitation
   - The observer is only present for a limited time and cannot register what happens before or after they leave. Does the observation during that period represent the normal functions in the organization.
   - The observed organization limits the access to some information or areas.
4. The complexities and limitations of the human mind
   - The subject may try to mislead the researcher and only emphasize things that are positive and flattering to him/herself.
   - Human errors. The subject is trying to be honest but inconsistently brings out false things. Other human errors are forgetting, misunderstanding, subject’s own biases, etc.

McKinnon has defined three strategies and five tactics to prevent threats to validity and reliability. The strategies are focused on the planning and control of the research in general. The strategies and some of their characteristic are:

1. Lengthen the amount of time the researcher spends in the research setting
   - To get to know the organization better. The bias stabilizes the research and better corresponds to subject’s normal behavior.
2. The use of multiple methods and observations
   - The information from multiple methods usually strengthens the conclusions. In field research there are several features that can affect the research.
3. The researcher’s social behavior in the field
   - How well the researcher is accepted in the organization affects the information gathering and access to it. Inform the subject about the research in advance.

The tactics are the more specific methods that can be used in certain types of field research or in some stages of it. The tactics and some of their characteristics are:

1. Approaches to note taking
    - It has to be systematic and logical. It can't change from one day to another.
    - Analysis in field research is continuous.
2. Choice of type of participant observation
    - Watching from outside: researcher's presence unknown to the subject.
    - Passive presence: researcher present but no interaction with the subject.
    - Participant with hidden identity: known to the subject but not as a researcher.
    - Observer as a participant: co-worker to subject and known as a researcher.
    - Limited interaction and active control: observes and talks with subject.
3. The use of team research
    - Parallel: two or more researchers observe similar activity and conduct similar interviews at different research sites.
    - Duplicate: two or more researchers observe the same research site and conduct the interviews together.
4. Informant and respondent interviewing
    - Informant gives general information on the objective of the research, like history, background, etc. Good for getting rid of limitations to information access. Usually includes members of the management.
    - Respondent: more specific information about the respondent's own work, experience and co-operation with other individuals and units, depending on the focus of the research.
5. Probing questions
    - No predefined questions but defined according the situation. Informal questions.

Next, the threats to validity and reliability in this research is discussed based on McKinnon's categorization and how they have been avoided:

1. The observed causal effects

All of the interviews were done within the interviewees' own organization. The required time and space for the interview was agreed with the interviewee

beforehand. Only the interviewer(s) and the interviewee were present during most of the interviews. The staff of the organizations was informed of the research and the aim of the research beforehand and that some members of the staff would be interviewed. However, the atmosphere was not good in a few interviews. This could have been because the staff were tired of the IS implementation or simply because the person did not like the system. In one case the interviewee refused to answer the questions at all (doctor) because of his opinions on the system.

It was also guaranteed that the results of the interviews would only be for the use of the researchers and that none of the respondents could be identified when the results were published. This promise was accomplished well in the reports to the organizations, which were all public. However, in some cases there was only one interviewee from a unit or department because of its small size and in those cases it was difficult to keep the identification promise. Another reason for observer bias could be the number of interviewees (second case). Sometimes there were three researchers asking questions, which might have felt uncomfortable for some interviewees.

Often, the reaction of the interviewees was “I don’t know anything about IS” but after explaining that there was nothing necessary to know and that the interview was more about sorting out the experiences and feelings about the themes, the interviewee relaxed. In general, most of the interviews were very relaxed and free of formality and the interview was more like a discussion that was led by the themes of the research area.

2. Observer bias

Observer bias is difficult for the observer to identify. During the cases the research about the health care IS was in the initial stages and there was not much information about the area in general, and especially about research done in Finland. Thus there was not much available information to affect observer bias, but on the other hand the lack of information affected the preparation for the research.

However, observer bias could be developed in that the health care was observed based on the assumptions generated from private sector industries. The assumptions and lack of knowledge from that area could have affected the research, at least in the beginning.

Attempts were made to diminish observer bias through good preparations and familiarization with the case organizations beforehand. A large amount of material was gathered and analyzed in order to get as clear picture of the research environment as possible. Informant interviews and discussions were also held before the main interviews, and meetings with the management of the organization and the research steering groups. The demands of the case organizations were defined in the meetings and the main themes of interviews

agreed. After that, the themes were completed with some questions focusing on the needs of the researchers.

In the second case most of the interviews were done by two or three interviewers. This reduced the effect of single researcher bias since the analysis was accepted by each researcher. Multiple methods (interviews, questionnaires, and group interviews) were used in order to get confirmation or rejection of certain issues.

3. Data access limitations

Data access limitation is sometimes difficult to observe if the researcher does not know the organization or the industry well. In the cases in this research this was an actual threat. However, in the first case the organization seemed to be truly committed to the research and the limitations to some information was not obvious. The commitment was also obvious in the second case, but since the partner to the health care organization was a private company – which, in addition, was only starting to expand its business to public health care - there was a threat that all the economic information about the IS project would not be delivered. On the other hand, this is quite normal for a firm operating in an industry where the competition is tough.

The time used for the research was about 18 months in both cases. In that respect one could claim that the time used in the organizations was sufficient. The goals in both cases were such that an increase in time would probably not have brought any additional information.

The acceptance of the researchers was mainly positive. There were several organizational changes in the first case that caused some negative comments from the staff about one more project. Although the methodology was action research, which aimed at participation in the case organization, the researchers did not disturb the staff in their work. The interviews were done on the staff's terms so that they would not cause any negative attitude towards the research.

4. The complexities and limitations of the human mind

The need to emphasize only the positive items of the research object was a threat in the second case, where the partner from the private sector was an object. The research setting in which the evaluation research was ordered by an organization (management and IS project group) that was the goal of the evaluation was a bit unusual. However, it seemed that there was a genuine attempt to find out the success of the IS project and there were no attempts to mislead the researchers.

Numerous interviews were conducted in order to avoid any misrepresentation of saturation (Mäkelä 1990) and to make sure that certain conclusions were well reasoned. When certain themes keep being repeated in the interviews, saturation is reached. Reaching saturation also prevents the possibility of misunderstandings and forgetting things.

In summary, the threats to validity and reliability presented by McKinnon (1988) were covered in a satisfactory way. Even though the concepts of validity and reliability were clear to the researchers before the cases, McKinnon's categorization was not familiar to the researchers at the time the research was done. Thus it was not used as guideline during the research but acted more as a checklist from which the threats could be checked after the research had been completed and the success of the research had been evaluated. For that purpose, the categorization was useful.

3 HEALTH CARE AND HEALTH CARE INFORMATION SYSTEMS IN FINLAND

This chapter presents basic features and components of the health care sector in Finland and the role of IS in it. The chapter should help the reader to understand the basic features of the public sector organization and through that the demands on decision-making.

3.1 Description of the structure and development of public health care in Finland

3.1.1 The structure and tasks of basic health care

The Ministry of Social Affairs and Health prepares the legislation on social welfare and health care, and steers and supervises its implementation. The Ministry also prepares the four-year (electoral period) Target and Action Plan for Social Welfare and Health Care, which the government approves. In addition, social welfare and health includes a number of bureaus and institutions, which, in co-operation with the Ministry, take care of a range of research and development, statistical and supervisory functions. These agencies and institutions are the National Public Health Institute (KTL), National Agency for Medicines (LL), National Research and Development Centre for Welfare and Health (Stakes), and the Insurance Supervisory Authority (VVV) (Järvelin 2002; Health Care in Finland 2004).

For central government purposes, Finland is divided into six provinces, which are each headed by a State Provincial Office and take care of the guidance and supervision of the social welfare and health care sector in their respective provinces (Järvelin 2002; Health Care in Finland 2004). The basic organization of the Finnish public health care system is presented in Figure 4. The main interest of this thesis is highlighted in bold.

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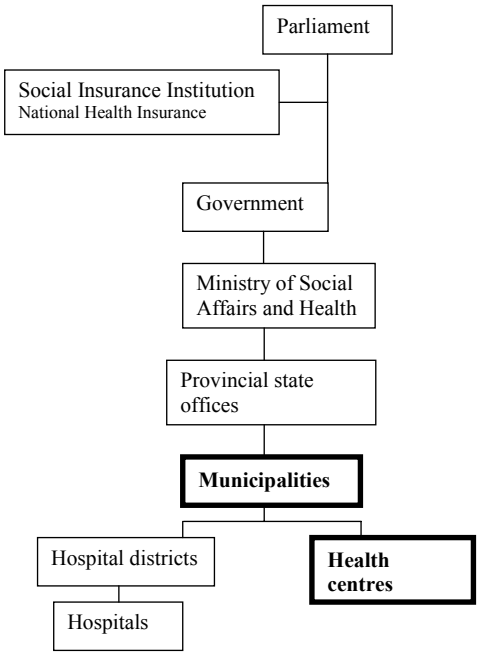

Figure 4 Organization chart of the health care system in Finland (Järvelin 2002).

The main responsibility for arranging health services is with the municipalities. The financing of the services is covered from the taxes the municipalities collect and from State subsidies. The Ministry of Social Affairs and Health has a central input to the health care planning, al though the 1993 State Subsidy reform led to some reduction in State regulation (Jakubowski & Busse 1998; Järvelin 2002).

The public health services are divided in two areas: special health care and primary health care. Special health care is divided into 20 hospital districts and each municipality belongs to a particular hospital district. Each district contains a central and a regional hospital. Five of the hospitals are university hospitals, which provide specialized levels of treatment. Each hospital district organizes and provides specialized hospital care for the population in its area.

Basic health care is provided in health centers in the municipalities. The municipalities can either have their own health centre or two municipalities can form a health care federation of municipalities that have a shared health centre. In 2003 there were 278 health centers, of which 70 were health care federations and 208 municipalities' own health centers. One health centre can have several health stations in the municipality or federation of municipalities. To better illustrate the diversity of the responsibilities of a single health centre, a list of the tasks a health centre has to carry out is given below (Health Care in Finland 2004):

- To provide guidance in health matters and to carry out prevention of diseases.
- To organize medical examinations and screening for local people.
- To run maternity and child health clinics.
- To arrange for school, student and occupational health care services.
- To organize the provision of dental health care.
- To organize the provision of medical treatment for local residents.
- To organize home nursing services.
- To provide rehabilitation services.
- To arrange provision of those mental health services that can appropriately be provided in health centers.
- To provide a local ambulance service.

Although the State has reduced its steering and allowed more independence in decision-making at the local level, it still has important control and steering mechanisms in play. These mechanisms have been under discussion and criticism, and the Council of State has started a national project to ensure the future of health care. Expert groups have been established to clarify the problems of five areas in health care, of which the health care steering mechanism is one. The role of the steering mechanism influences local management decision-making and is thus in a central role when municipalities try to arrange health care services and allocate resources according local needs. The steering mechanisms can be divided into four categories (Huttunen 2002):

- Norm control
  - Laws, statutes and other regulations
  - Sanctions
  - In practice, the commitment to norms is not very tight
  - Difficult to use for steering practical activities and thus left in the role of describing the basic and target levels.
- Resource steering
  - State subsidy system is the most important resource steering instrument
  - The aim is to increase cost responsibility to municipalities and to move decision-making from State to service organizers and producers.
- Information steering
  - Aim is to increase the use of local and national information
  - Includes, e.g., educational, statistical and research information, providing expert services, preparing, providing care and quality recommendations.

  - In future the Internet will be an important means of communication between citizens and municipalities
  - Not exploited enough
  - Several ongoing development projects in the IS area, but lack of resources makes the results uncertain
  - In health care there is a need at both the municipality and producer level for practical management supporting reference and development benchmarking information.
- Surveillance
  - Basic security board acting under the Ministry of Social and Health assesses the appropriateness of the public service system
  - Legal protection center steers and controls the professional staff in health care
  - Provincial State Offices (5) monitor the legality and appropriateness of the public and private health and social care service production and professional staff in their areas
  - At the municipality level the boards and other institutions monitor the activities of office holders and other staff in the municipality
  - The surveillance of the health sector is very fragmented and the resources used for surveillance have decreased. Therefore, the whole surveillance system should be assessed.

On the whole, the State reduced the steering of the health services considerably during the 1990s. Mandatory norms have less practical meaning as a steering mechanism than before and resource steering has also lost its importance. Cuts in State subsidies, moving to calculatory subsidies and increasing the share of municipal taxes in service provision have diminished the potentiality of resource steering. There is a lot of expectation laid on information steering but so far it is still only developing. Furthermore, the surveillance of the health care sector is badly under-resourced; Finland uses less money for surveillance than any other Nordic country (Huttunen 2002).

On the municipal level the main decision-making power is in the municipal council, which is elected every four years through a public election. The council appoints the municipal executive board as well as the members of the various municipality boards (like board of health), according to the strength of the political parties on the municipal committees (Järvelin 2002).

The municipal boards sometimes have to make decisions about things they don't necessarily have a lot of knowledge about. That usually creates problems in allocating the money. Members of the council have to make decisions without

necessarily knowing the effects. For example, in the second case of this thesis two interviewed members of a council said:

> *"... the shoddiness of the decision making in municipal is realized when we as laymen have to make decisions about things we really don't know at our heartstrings."*

> *"Pretty much in same way as in general in these IT-projects, the understanding of IS issues by an average man can be very modest, and in that way easily manipulated... ...We pretty much depended on the introduction to the matter from the officials."*

The decision-making process and emphasis varies between municipalities to some degree. Lately, the general trend has been to delegate power from the municipal councils to the various committees and leading officials. There are also variations in the planning and organization of health care. The main responsibility lies with the health committee, the municipal council and the municipal executive board, but the leading personnel in the health centres are often included in the planning and organization of the services (Järvelin 2002). This should reduce the problem the two interviewees above brought out.

Though the attempts to increase the effectiveness of the area have failed, the expenses in Finnish health care related to GDP have been considerably smaller than in other Western European countries since 1970. Finland uses less money for health care per inhabitant than most of the EU countries. The financiers of Finnish health care are the State, the municipalities, the Social Insurance Institution, employers and households. The share of the municipalities, as well as that of the Social Insurance Institution, has increased considerably during recent years and the State share has decreased. The households' share has also increased and is indeed one of the highest in the EU (Huttunen 2002).

3.1.2 Some recent developments and changes in the Finnish health care sector

In the 1990s the there were several changes made to the legislation on Finnish health care that affected the planning and strategies in organizations. The changes in norm control, the new bookkeeping Act and changes in the Primary Health Care Act affected the local health care authorities and increased their own decision-making.

One more essential change in Finnish, and also European, health care has been a change to the purchaser-provider model. The basic focus of the purchaser-

provider model is that the ordering and producing of services remain separate administratively. The rationale of the model is to bring together a range of separate functions with the potential to improve efficiency, effectiveness and responsiveness (Figueras, Ray & Jakubowski 2005). In Finland the changes in norm control and the Primary Health Care Act affected the development of the model. Basically, there are four central actors in the model (Lillrank & Haukkapää-Haara 2006):

- Client/organizer/financier of the activities
- Providers
- Purchasers
- End-users of the service (e.g. patients, relatives, employers).

The fifth set of actors are the regulators, like the State and trade organizations, who create the normative environment for health care by regulating the rules and methods and ethical principles (Lillrank & Haukkapää-Haara 2006).

The changes in norm control were possible when the State subsidiary system was changed in 1993. The focus was to increase the freedom to organize the public services according to local special characteristics. At the same time, the change in the Primary Health Care Act defined that the municipality did not have to produce the services but only to organize them. Together, these changes were focused on increasing the cost-awareness of the municipality as a purchaser since it should compare the cost of the services it was providing. On the other hand, the purchaser-provider model changed the role of the municipalities' own health centers to that of an equal to other service providers and forced it to productize its services to offer better information to the purchaser.

However, so far the results of the model have been varying. Because of the political reasons, the results easily become compromises, which have no prerequisites to fulfill the expectations Therefore it is important to identify the components which affect the steering of the health care (Lillrank & Haukkapää-Haara 2006). The experiences from other countries are pretty much the same as in Finland. The general reason for the failures seems to be the purchasers' inexperience in making contracts and arranging competitive bids (Konttinen 2005).

The change in the Bookkeeping Act was a consequence of the attempt to move the public sector towards more market orientation. The purpose of the renewal was to add a profit calculation point of view to the bookkeeping. Cash flow has to be based on the revenues from the services. Thus the management has to know more about the cost structures of the functions and services.

3.2 IS development in health care

3.2.1 Definitions of health care information systems

The definition of health care information systems varies to some degree. The most common are medical informatics and health informatics, and their use varies as they are sometimes used as synonyms and sometimes they have a slightly different distinction (Nykänen 2000). The term "medical informatics" originates from the end of the 1970s (van der Lei 2002) and is widely used to mean various aspects of information systems in health care. The differences greatly depend on which cultural environment they are used in and what constraints the definitions have. Medical informatics refers more to medical science and to medical care, whereas health informatics more widely refers to health care processes and its process as whole (Nykänen 2000). Health informatics also includes the human role in his own care and the major information-handling roles of the non-medical healthcare professions. In this thesis health informatics is preferred since the viewpoint also includes the professions of non-medical decision-making and a wider perspective than just medical issues.

Korpela and Saranto (1999, 19) define health informatics in the following, quite general, way: health informatics is *"the application of information and communication technologies (ICT) in healthcare (as a field of science and practice)."* The definition emphasizes the technical environment of the information system in general and does not include any aspects of how to exploit the technology or how it is expected to affect to the area. Alasaarela (2003, 4) also uses a quite technical definition of health care information systems: "*The meaningful ensemble of technical devices, instruments and methods which are needed to gather, store, transfer and distribute information about patient and diseases and administrative information in health care*."

Van der Lei (2002) defines medical informatics as *"…the science of using system-analytic tools… to develop procedures (algorithms) for management, process control, decision making and scientific analysis of medical knowledge."* In same article he uses J.H. van Bemmel's[3] definition:*" medical informatics comprises the theoretical and practical aspects of information processing and communication, based on knowledge and experience derived from process in medicine and health."* The first definition stresses the use and purpose of the information, and the latter the content and source of the information. In this way,

[3] Original source (van Bemmel & Musen 1997).

medical informatics is understood in a broader context than health care informatics.

The socio-technical aspect is emphasized in the following definition of hospital information systems: *"a hospital information system is that socio-technical subsystem of a hospital, which comprises all information processing actions as well as the associated human or technical actors in their respective information processing role."* Further, the systems are differentiated into computer-supported systems (tools for information processing) and non-computer-supported systems (the remaining parts) (Winter et al. 2001). Although the definition is about hospital information systems, it is related to health care IS since hospital systems are a smaller part of health care IS.

Raghupathi (1997) includes the science perspective in the definitions saying that health care information systems (HCIS) encompass a wide range of applications from many disciplines, including medicine, computer science, management science, statistics and biomedical engineering. This is an important perspective in understanding the complexity of the research area. Turunen (2001, 47-53) has similar discussion in his research on evaluation methods for health care IS. He compares the different health care paradigms (health, nursing and medical sciences) and their effects on professions in the area. Assumptions about right and wrong differ between the paradigms, which affects the professions and demands of IS evaluation in health care.

Korpela and Saranto (1999, 21-23) present a quite broad and general division of the different dimensions in health and social care IS. According to them, the area can be approached through scientific research and practical actions:

1. The dimension of *content* covers the whole gamut of social and health sciences and social and health practices. It includes issues like promotion of welfare, activities of citizens, service systems in special and basic health care, health administration, nursing practices and science, clinical medicine and research in biomedicine.
2. The dimension of *technology,* which, as a discipline, covers various areas of computer sciences and, as a practical area, various types of information and communication techniques and data management. These areas are the history and philosophy of IT, evaluation of IT, IS, software technology, hardware technology and methods of data processing.
3. The dimension of *viewpoint* (mode of action) describes the way in which the two previous dimensions are approached through basic and applied research to practice and all the way to strategic decision-making. This dimension covers issues like basic and applied research, product development and use, studying and education, and planning and management.

The above definitions of health care IS emphasize different aspects: technology; use, accessibility and source of information; user of information; scientific approach; and discussion about the different paradigms and disciplines and aspects of practice and science are included in the definitions. What is missing in these definitions is the link between health care IS and other resources in a health care organization. Therefore, the definition of health informatics in this research could be as follows: *Health informatics is a socio-technical information system based on scientific and practical knowledge, improving the effectiveness and quality of different levels of health care processes from strategic management to supportive functions by integrating and operating with other resources in the organization's internal and external environment.*

Socio-technical means the integration of technological systems and humans. Scientific and practical knowledge should include both medical and IS knowledge, and expertise to increase the integration of these two fields. The different levels of health care include all the processes in which the information regarding the patient's health, other health information and knowledge of medicine is used. This information should be integrated and used with the resources in the health care organization.

3.2.2 The development of IS in health care

The role of IS in health care started to grow in the middle of the 1990s, and the effectiveness of IS in health care is under careful consideration now. The ever-diminishing resources and increasing demand don't give change to false investments. The introduction on a larger scale has been going on for some time, but the introduction of such components like electronic patient records has been slow (Grimson et al. 2000; van Ginneken 2002).

In a health informatics exploitation strategy by the Finnish Ministry of Social Affairs and Health, the responsibility to develop IS functions to support services is pointed towards local municipalities. The strategy suggests that IS solutions have to be based on open compatible and standardized solutions and entities. This means that they have to have real-time information on the developments, use and future trends in IS (Sosiaali- ja terveydenhuollon tietoteknologian hyödyntämisstrategia 1995). Since the strategy is decentralizing the decision-making about IS, the demands for understanding the dynamic IS environment in municipalities is growing. On the other hand, it sets certain rules that have to be followed but it does not describe any specific technical rules.

This is quite opposite to the National Health Service (NHS) in Great Britain, where the government has set rules on which IS components local authorities are allowed to acquire and also regulally assesses the compatibility of each

component in those systems. Through bad experiences of centralized IS in the NHS, it is investing heavily in projects covering a national electronic patient booking system, electronic health records, electronic reporting of laboratory results and digital prescriptions to build a nationwide compatible system (Guah & Currie 2004).

Although with a different approach to IS implementation and development, these two examples show that the compatibility in creating the system is one of the key areas. Compatibility has different dimensions from internal organization to internationally compatible systems. A large part of the evaluation of a system's success and effectiveness has concentrated on this area of technical issues.

One reason for the increased interest in IS among health care providers is that they are predicted to face an unprecedented era of competition and cost pressures. Thus IS is being explored as an opportunity to reduce the costs of service delivery while improving quality (Raghupathi 1997). Because of these pressures, and also because of new possibilities in the dynamic area of information technology, adoption of IS in health care has been fast. At the end of the 1990s information systems in health care were said to be some 10-15 years behind sectors such as banking, airlines and manufacturing industries (Raghupathi 1997).

There are at least two reasons for that. First, the health care industry has been a somewhat isolated area, where it is difficult to bring new ideas from other disciplines without first having the approval of the health care staff. This is a central feature of the public sector in general since it traditionally concentrates on internal and managerial issues (Ke & Wei 2006)[4]. The professionals in health care are highly educated and don't easily accept studies and paradigms from other disciplines, but are more likely to highlight the differences between their own industry and other industries (Suomi, Tähkäpää & Holm 2001; Turunen 2001, p. 18). The social networks of the groups of clinicians and nurses are tight and this has an effect on how the groups are adopting new innovations (West, Barron, Dowsett & Newton 1999). Thus it is difficult to reason previous, mainly private sector-based and technical or business-emphasized research to fit the health care industry.

Second is that the recent fast development in IS and success in other industries has made IS a tempting way to increase the effectiveness in health care (Berg & Toussaint 2003). Previously, the need for sharing information with other organizations was low and there was no need to develop such areas (Grimson et al. 2000). For example, the decrease in data storage costs, development in IS networks and improvements in application development like ERP (enterprise

[4] Original source: (Weber 1947).

resource planning) systems has showed that it is possible to manage a large amount of information effectively and safely. However, although the public sector is slow in adopting such innovations, it has started to bridge the gap.

One distinct feature is that health care is probably also going to skip some stages in the evolution of information systems planning and management compared with more mature business areas. The systems have gradually developed from decision support systems based on Bayesian statistics and decision theory in the 1950s to ERP systems like integrated electronic patient record systems (EPR), including a wide range of different sub-systems in the 1990s (Nykänen 2000, p. 13, 48-51).

Although the development started some 40 years ago, the rapid development of IS in the last 10-15 years has led to the introduction and wide use of EPR. The idea of computerizing health care records has been under discussion since the early 1960s, when hospitals first started to use computers (Grimson et al. 2000). Thus EPR was a final boost for the area since it pulled together a large amount of health information and created an integrated system. EPR also meant a huge increase in the amount of hardware, since all the staff should have access to the records (van Ginneken 2002).

There are different ways to categorize health care IS. Suomi (Suomi 2000; 2001) has classified the systems from the point of view of general information systems science. The IS classes are:

- customer supporting systems
- interaction supporting systems
- consultation systems
- decision supporting systems
- process supporting systems
- economical systems
- preparation tools
- administrative tools.

Turunen (2001) has conducted research on evaluation methods in health care information systems from the viewpoint of interest groups and, based on several earlier classifications, he has ended up with the classification in Figure 5.

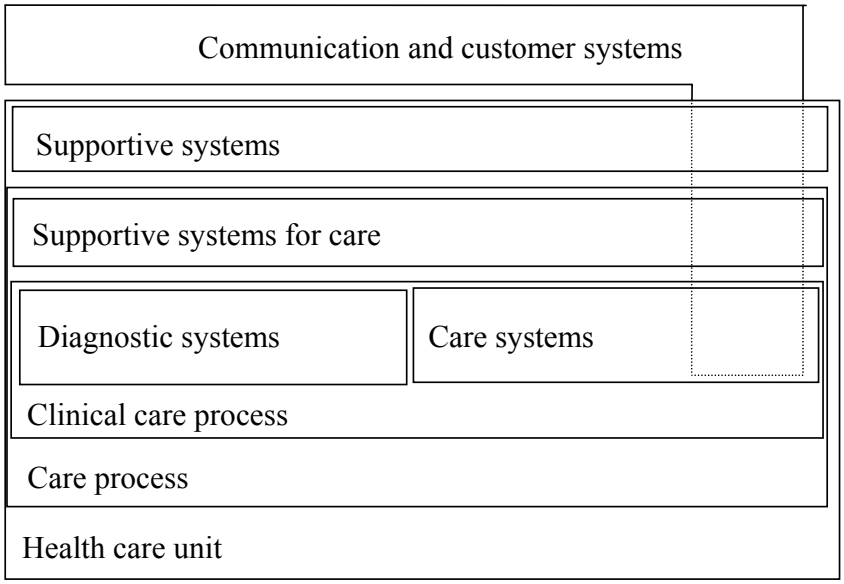

Figure 5 Health care information systems for the evaluation (Turunen 2001).

Communication and customer systems can be called communication, consultation and customer systems. These systems include the data transmission between health care units, customers and other units and actors. In supportive systems there are financial management and administrative systems. Supportive systems for care include systems that support the care process. Diagnostic systems are diagnostic and clinical decision support systems. Care systems include systems that support the treatments and systems that support the work of nurses, like registration of treatments and registration of drugs.

4 THE THEORY OF THE RESOURCE-BASED APPROACH AND IS MANAGEMENT IN HEALTH CARE

4.1 Comparison of different theories for IS management in health care

IS research has a long tradition of adopting theories from other disciplines like economics, computer science, psychology and general management, and modifying them for its own purposes and using them as its own. Because of this, IS research has a wide selection of theories and conceptual foundations (Wade & Hulland 2004). This makes the selection of an appropriate theory or approach difficult but, on the other hand, gives lots of possibilities in choosing viewpoints to the phenomenon. This could be a clear advantage when the research is moving to new areas like health care IS – as is the case here.

The public sector has not been very keen on using theories or frameworks from the private sector. The quality of public services has not been something that could be set under discussion on effectiveness. However, the need to improve the effectiveness has forced the public sector to adopt new viewpoints. Therefore, it is interesting to make a short analysis of the different theories emphasizing the different areas. Each, most likely, has some input.

This section is based on two papers (Suomi, Tähkäpää & Holm 2000b; 2000a). Those papers discuss different approaches to understanding health care IS and strategic management, and list eight possible theories. Each approach will be discussed first from a general viewpoint and then their applicability to health care IS strategic management. The theories are selected based on their popularity in the IS field and on their ability to act as a proper theory to discuss the problems and their causes, as well as a solution to the problems. They are intended to give grounds for the IS development in health care.

The list is by no means a complete list of possible theories but a list that can be used as a basis for selecting an appropriate theory in health care IS management. The selection of an appropriate theory for public health care management is a difficult since the area is quite different to private industries' profit-oriented approaches. However, it seems that there are theories in the IS field that can be applied in health care IS research but need more or less fine tuning, just like the theories the IS field has adopted. After all, the issue of

interest is very often the same whether you do research in the private or public area, namely an increase in effectiveness and quality.

4.1.1 Stakeholder Analysis

Stakeholders are groups and individuals that can affect, or are affected by, the achievement of the organization's purpose. Without the support of stakeholders, an organization would cease to exist (Freeman 1984). Owners, employees, customers, suppliers, government, community, media, unions, consumer groups and environmental groups are all representatives of typical stakeholders. Management's role is to interpret the stakeholders' world and then direct the everyday activities of the company in such a way that the balance between each stakeholder and the company is preserved. If the relationships among stakeholders become imbalanced, the survival of the firm can be endangered (Yläranta 1999).

The classical debate between stakeholder theory and neoclassical theory is whether the firm should or should not have responsibilities toward stakeholders other than owners. According to neoclassical theory, the firm's sole and only interest should be profit maximization - i.e. maximization of the stakeholders' wealth. The stakeholder theory states that the firm also has responsibilities toward other stakeholders, such as customers, personnel, financiers and the community. Matikainen (1994) maintains that the responsibilities toward stakeholders basically exist for two reasons: as means for higher goals (efficiency argument) or as an end in itself (moral argument) (Matikainen 1994).

The efficiency argument states that stakeholder interests are taken into account as means for higher level goals (profit maximization, survival or growth). If those interests are neglected, the stakeholders tend to allocate their resources to alternatives thus threatening the survival of the firm. (Matikainen 1994).

The moral argument states that corporations, given their size and economic power, have a moral obligation that extends beyond its shareholders to society at large. It is argued that there are no moral grounds on which stockholders interests can be given priority over the interests of other stakeholders. From this perspective, the corporation should seek maximization of social benefit and actively consider the interests of the environment, employees, suppliers, etc. (Matikainen 1994).

In many cases increasing the satisfaction of one group of stakeholders decreases the satisfaction of others. Managers must work to find the point where most of the stakeholders are satisfied most of the time (Dolan 1998).

4.1.2 Cost-Benefit Analysis

Cost-benefit analysis (CBA) is the analysis of an opportunity to demonstrate the benefits in cost saving in order to receive management commitment and support to implement (Village & Dmytrenko 1997). We should only provide services if their benefits outweigh their costs (Williams 1974). Today, CBA is being used for a wide range of opportunities, which are no longer limited to the purchase of highly priced equipment. Generally, the change in the business climate over the past years has resulted in an increased focus on an organization's bottom line. This has affected business decision-making, requiring CBA to be utilized for all major purchases, expansions, organizational changes, etc. It is recommended that CBA should be approached as a multiple step process, beginning with a preliminary survey, which is followed by a feasibility study. Together, the steps provide the necessary information to execute a CBA report (Village & Dmytrenko 1997).

Every rational economic agent faces the problem of seeking solutions that enable him to maximize his net benefits. To this end, in order to determine whether or not it is advantageous to adopt a particular choice, he tries to define and quantify its possible effects. What differentiates private analysis (financial appraisal) from public analysis (economic or social appraisal, or what we call cost-benefit analysis) is that the latter adopts a social perspective. From this perspective, CBA is the tool of applied welfare economics, which connects the decision to perform an action with its effects in terms of benefits and costs to all the members of a community (Battiato 1993).

There is a wide range of non-market items that can be valued in one way or another. Nevertheless, there are goods for which no meaningful valuation can be made, especially pure public goods, which can jointly benefit many people and where it is difficult to exclude people from the benefits. Whenever cost-benefit analysis becomes impossible, since the benefits cannot be valued, it is still useful to compare the costs of providing the same beneficial outcome in different ways. This is called cost-effectiveness analysis and is regularly used in defense, public health and other fields (Layard & Glaister 1994).

Cost-benefit analysis in the health care IS environment is difficult to conduct. The analysis of costs is basically the same and has the same problems as in any other industry. Those are mostly indirect costs, like the management activities in IS projects. Also, the direct cost and benefits are very often the same in different industry areas. Those could be things like the cost of the computers or information network, and benefits like goods or subventions from the government (public sector especially).

The problem is how to analyze the indirect benefits, which, in the health care case, are healthier people. All the investments, including information technology,

should focus on this goal. If we invest a certain amount of money in information technology, what are its effects on patients' health in the long run? What makes it even more difficult is the definition that one of the basic roles of public health care is that it should be able to offer preventive care. How we can measure which factors have affected the better health of the citizens in the long run? This is a particular problem for primary health care in the public sector.

This gives rise to the question of what we should analyze and how far the cost-benefit analysis should go in health care. The development of a method by which we could precisely analyze the health effects achieved after investing in the information system would probably be endless. Instead, we can use the cost-effectiveness analysis (Layard & Glaister 1994) to measure how effectively a certain product is produced compared with it being produced in some other way. In simple terms, we can measure how long it takes to write a patient's information into the computer and how easy it is to access it again compared with writing it manually. These kinds of measures are reasonably easy to develop and are still a good starting point in evaluating the benefits of an information system in the area.

Very often there is opposition when IT investments are under discussion and the main target is usually the achieved benefits from investments. It is easy to claim that there has not been any advance in health effects after information systems investments but considerably more difficult to point out the benefits. However, the use of information systems is fairly new in the sector and still in the middle of heavy progress and the effects will only be seen after the sector has a stronger tradition in their exploitation.

4.1.3 Competitive Advantage

In early research in searching for competitive advantage from IS it was suggested that information technology can be used to create barriers for new entries, increase switching costs, change the basis of the competition, lower the bargaining power of suppliers and create new products or business (Turunen & Salmela 2003).

Later, some other factors arose, which changed the meaning of the information systems as a means of gaining competitive advantage. The risks in changing the competitive rules started to become more visible and analyzing competitors' resources and capabilities was essential. The sustainability of the achieved competitive advantage when copying the technology became easier and cheaper and was thus critical. It was stated that the importance of using a company's unique assets and resources combined with information technology was essential. Behind this view were two strong assertions: first, that the resources and

capabilities possessed by competing firms may differ, and second that those differences may last a long time (Turunen & Salmela 2003).

Porter and Millar (1985) found that IT changes the rules of competition in three ways: first, it changes the structure of industry; second, it acts as a lever that organizations can use to create competitive advantage; and third, the information revolution spawns completely new business.

Pfeffer (1994) emphasizes the importance of people and how they are managed. He notes that the individual is becoming a more important source of competitive success because many other, previously important, sources have lost their power. Traditional sources of success, like product and process technology, protected or regulated markets, access to financial resources and economies of scale can still provide competitive leverage although to a lesser degree than earlier. That's why organizational culture and capabilities derived from how people are managed have become more vital.

Although the biggest changes and increase in resources are focused on information technology, it can't create competitive advantage alone because in many environments and industries the technology is usually easy to imitate (Barney 1991). This is also the case in primary health care. The treatments and the equipment for conducting the treatments are quite similar and easy to imitate. Therefore, it is difficult to achieve any competitive advantage through them. Only together and with the aid of other two resources (human and organizational) is it possible to create some unique knowledge that only that firm possesses.

Besides the similarities in treatments and equipment, the problem for health care, especially in the public sector, is that because of the strategic legislative control it has proved difficult to create any unique knowledge. Although the new legislation allows municipalities to acquire health services from other municipal or private organizations and specialize to certain treatments, this possibility has not been widely used. Political pressure to maintain health centres as an organization that offers a wide range of primary health care services is too strong. Their starting point for competition is quite poor.

On the other hand, competition in public health care has been a quite unknown phenomenon so far and one strong reason for that is that the sector wants to keep its protected position. Although there has been a lot of discussion about outsourcing in health care, which could lower the protection, it has so far mostly been concentrated on related supportive functions like laundry or food services and nowadays increasingly on IS. The core functions have been almost untouched. But, because of the need to rationalize the health care those issues have been raised under consideration. If the public health care organizations have to compete with the private sector, they also have to consider their competitive advantage in a new way and maybe have to try to create some unique knowledge.

Health care is going to face increased competition. In order to create unique knowledge to gain competitive advantage, organizations will probably have to focus on a wider area than technology development. As Pfeffer (1994) says, the importance of people and how they are managed has become even more important, and this is completely true in a sensitive and intimate area like health care.

4.1.4 Resource-based Approach

The resource-based approach was developed by Edith Penrose in the 1950s. The theory was originally known as the theory of the growth of the firm (Penrose 1959) and is also discussed also with concepts like the resource-based view (Kangas 2000) and the resource-based model (Barney 1991). Although the approach concentrates on industrial firms, Penrose emphasizes that it can also be applied to other firms (Penrose 1959).

Kangas (2000, 60) uses Penrose's definition, which claims that a firm is both an administrative organization and a collection of productive resources:

"the administrative structure of the firm is the creation of the men who run it; the structure may have developed rather haphazardly in response to immediate needs as they rose in the past or it may have been shaped largely by conscious attempts to achieve a 'rational organization" (Penrose 1959, 31). Whether the structure has been created haphazardly or with conscious attempts has an effect on the identification and integration of later resources. The haphazard resources are more likely to be inappropriate and more difficult to integrate, and thus less effective in the long run.

Penrose (1959) also defines that the resource-based approach assumes that a firm's competitive advantage lies in the bundles of service-creating resources that can be exploited, rather than in the product-market combinations chosen for the deployment of these resources. According to her, a resource can be viewed as a source for providing an array of services for the clientele of the company. Resources are usually obtainable in discrete amounts (Penrose 1959). Barney (1991) defines a firm's resources as including all assets, capabilities, organizational processes, firm attributes, information, and knowledge that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness. He classifies them into three categories: physical capital resources, human capital resources and organizational capital resources.

According to Kangas (1999), the resource-based view takes Porter's value chain logic a step further by examining the attributes that resources identified by value chain analysis must posses in order to be sources of sustained competitive

advantage. Barney (1991) described the following four indicators of a firm's resources that generate sustained competitive advantage:

- Value: Can the firm's resources respond to environmental opportunities and/or threats?
- Rareness: How many competing firms already possess these valuable resources?
- Imitability: Are these resources costly to imitate?
- Supportive organizational arrangements: Do the organizational arrangements support and exploit the resources?

These are mainly internal resources but an external viewpoint is also needed, and the external resources should also be considered, especially in health care, where the care process can be lengthy and include several organizations. Douglas and Ryman (2003) discuss strategic co-operation and strategic alliances in combining the resources across the organizational boundaries in pursuit of competitive advantage. Dyer and Singh (1998) have presented a similar view, where resources are shared across cooperating or networked organizations. Combined resources are also an issue in the public sector, and only recently have been noticed to be useful in increasing the overall effectiveness - e.g., there is a great need to get rid of overlapping activities.

The resource-based approach emphasizes organization-specific competencies and capabilities. Organizational competencies refer to the unique knowledge owned by the firm. Firms are presumed to focus on a few key core competencies that they can effectively exploit to improve their competitive advantage. Organizational capabilities refer to the firm's ability to use its competencies. They represent the collective tacit knowledge of the firm in responding to its environment. The capabilities are developed by combining and using resources with the aid of organizational routines - i.e., those specific ways of doing what the organization has developed and learned (Kangas 1999). According to Andreu and Ciborra (1996), core capabilities are those that differentiate a company strategically in terms of beneficial behaviors that are not be observed in its competitors. Such capabilities evolve from the competitive environment and business missions of the firm through a "capability learning loop".

Barney (1991) questions the claim that information systems are a source of sustained competitive advantage. As such, any strategy that just exploits the machines (computers) in themselves is likely to be imitable and thus not a source of sustained competitive advantage. Andreu and Ciborra (1996) suggest four guidelines if IT is to play a key role in making core competencies and capabilities really count for a firm:

- Look out for IT applications that help to make capabilities rare.
- Concentrate on IT applications that make capabilities valuable.
- Identify capabilities that are difficult to imitate.

- Concentrate on IT applications with no clear strategically equivalent substitutes.

One of the assumptions in the resource-based theory is that firms can gain competitive advantage through effective use of different resources inside the firm that create services for the customers. In health care the idea of competition has not been strong so far because of the very high public share in service production. So, in health care there has not been much need for the discussion about issues like the four resource indicators that generate competitive advantage described by Barney (1991). This has also had an influence on the effectiveness of the work. Although the quality of the care has been high, the use of the resources has not been necessarily very effective.

4.1.5 Knowledge Management

The discipline of knowledge management is little more than 10 years old. Knowledge management deals with the process of creating value from an organization's intangible assets. It's an amalgamation of concepts borrowed from the artificial intelligence/knowledge-based systems, software engineering, BRP, human resource management, and organizational behavior fields (Liebowitz 1999). According to Higgins (2000), knowledge management is the combination of technology and human judgment to understand and improve how the organization creates, saves and uses its awareness of how to do things. Knowledge management includes database management and the creation and documentation of how things are done in the organization. Elliot and O'Dell (2000) maintain that knowledge is information in action. They refer to Potanyri and Nonaka and state that knowledge comes in two basic varieties, tacit and explicit. Explicit knowledge comes from books, documents, white paper databases and policy manuals. Tacit knowledge is contained in people's minds and includes general information, experiences and memories. Knowledge management encompasses both types of knowledge. Here are some other definitions of knowledge management:

- Knowledge management is the systematic, explicit, and deliberate building, renewal and application of knowledge to maximize and enterprise's knowledge-related effectiveness and returns from its knowledge assets (Wiig 1997).
- Knowledge management is the process of capturing a company's collective expertise wherever it resides – in databases, on paper, or in people's heads – and distributing it to wherever it can help produce the biggest payoff (Hibbard 1997).

A variety of technologies can make up a knowledge-management system; intranets, data warehousing, decision-support tools and groupware are just a few. Hibbard (1997) maintains that the drivers for the sudden interest in knowledge management are two main factors: the explosive growth of information resources such as the Internet, and the accelerating pace of technological change (Hibbard 1997). Technology is not, however, the only component. According to Drew (1999), the key components of successful knowledge management are strategy, culture, technology and people. Hibbard (1997) also states that technology plays a very vital role in knowledge management, but technology on its own cannot make knowledge management happen. Knowing which technologies to select and how to deploy them begins with an understanding of just what knowledge management is.

Health care is a knowledge-intensive and knowledge-dependent industry area. Human is probably one of the most complicated mechanisms in the world and health care is continually generating more information on it and for the use of it. The need to control the knowledge to be able to offer the right information in the right place at the right time cannot be overestimated. When considering the growth of information needed and produced, the need for control is even bigger. The knowledge management in health care is therefore, without doubt, an essential area but less used.

Another dimension is the expanding environment of health care. Hospitals, health centres, clinics, pharmacies, customers and governments have to operate together, to offer better service to the customer. Thus the success of health care increasingly depends on the collection, analysis and seamless exchange of clinical, billing and utilization information or knowledge within and across the above organizational boundaries (Bose 2002).

Earl (2001) has divided knowledge management into three different schools: technocratic, economic and behavioral. The first is based on information or management technologies, which largely support and, to different degrees, affect employees in their everyday work tasks. The second, the economic school, is commercial in orientation and explicitly creates revenue streams from the exploitation knowledge and intellectual capital. The last is more behavioral, stimulating and orchestrating managers and managements to be proactive in the creation, sharing and use of knowledge as a resource.

Technocratic probably best describes the situation in health care now. One of the main challenges in health care is how to gather the most critical information into an easily accessible place and how to manage and distribute it correctly. The question about data security has emerged as one of the main issues when patient information is increasingly placed in databases to which practically everyone who uses the system has access. Another related problem brought by the Internet and other information networks is how to guarantee the security of networks in

which the patient information is increasingly transferred between and inside organizations.

Another issue is how to ascertain that the latest patient information is accessible for the clinicians. For example, in the first case organization of this thesis it was noticed that there were several independent clinical systems with their own files (laboratory, physiotherapy, etc.) where the information was stored without any integration. To use all this information effectively the clinician should have access all those systems, which are very often dispersed over a wide area of, e.g., hospital departments. If the information is stored in both manual and electronic patient information files, there is no need to say that always keeping the file in real time is an impossible task.

Therefore, one of the main targets is how to integrate all the information into an appropriate place so that it can be effectively managed, exploited and increased. There is also a threat that increased use of technology in creating, using and storing information just leads to an increased amount of information without creating real knowledge from it. This might lead to increased confusion and misuse of information, especially in an information-intensive industry. That's why knowledge management is essential when information systems are being developed and their role in industry is considered from a strategic, not just long-term, perspective.

4.1.6 Organizational Learning

There is a wide range of different descriptions and constructs about organizational learning among researchers. The definitions include such issues as encoding and modifying routines, acquiring knowledge useful to the organization, increasing the organizational capacity to take productive action, interpretation and sense-making, developing knowledge on action-outcome relationships, and detection and correction of errors. Some of the definitions involve individual human actors while others take place in the organizational level of analysis. Another distinction comes from the research objective: some researchers study how an organization learns while others concentrate on how individuals embedded in other organizations learn (Edmondson & Moingeon 1996).

There are five components which can be described and which are essential to the learning organizations: systems thinking, personal mastery, mental models, building shared vision and team learning. These five disciplines mean a body of theory and technique that must be studied and mastered in order to be put into practice. It is a developmental path for acquiring certain personal skills or competencies. These disciplines are not similar to the management disciplines

like accounting; rather, they concern how we individually think, what we truly want and how we interact and learn with one another. Disciplines should be developed as a whole so that they create a new tool for the organization. This demand leads to the conclusion that systems thinking is a fifth discipline. It is a conceptual framework that enables us to see and integrate the five disciplines into the coherent body of theory and practice in the long term (Senge 1990).

Kim (1993) discusses how individual learning can advance organizational learning and points out the link between the two. He has created an integrated model, the OADI-SMM model: observe, assess, design, implement – shared mental models. The model addresses the issue of learning through the exchange of individual and shared mental models. The individual mental model plays an essential role in the model and Kim is looking for answers to how these mental models are explicit and how they can be transferred into the organizational memory (Kim 1993).

Crossan, Lane, White and Djurfeldt (1999) also stress the link between individual and organizational learning. They have created an organizational learning framework (4I framework) with four related processes: intuiting, interpreting, integrating and institutionalising. Under these processes there are three learning levels: individual, group and organization. The levels define the structure through which organizational learning takes place and are linked together with the four processes. Ideas occur to the individuals, who share those ideas through integrating processes and, after going through social processes and group dynamics, those ideas may facilitate or inhibit organizational learning.

When considering the amount of information and the need to create true knowledge through IS, it also sets demands on organizational learning. As knowledge management, organizational learning is, perhaps, gaining some kind of lack of interest in the health care area. The need for learning may be realized but the implementation of the means to achieve some organizational learning is missing. One reason for this may be that organizations have a strict hierarchy where communication through different levels is poor.

The information systems might be one way to reduce the gap between the hierarchy levels and increase learning. For example, patient information systems are similar throughout the whole organization and co-operation through different levels could advance the learning effect. Effective use of information systems requires that the whole organization has the ability to use them, and they are therefore the ideal platform on which to develop organizational learning in other areas. In this case we talk about how organization can learn.

Implementation processes and projects often create unintentional learning. IS projects don't just create knowledge about the systems, they force the organization to consider their processes and organizational structures as well. How they can store this information and thus increase learning is organization-

dependent. For example, with intentional and unintentional learning, a third IS development project would probably succeed better than the first one.

How an organization can use the individual to increase its organizational learning as well as how an organization can develop individual learning much depends on the culture in the organization. If the culture prefers independent work, it is more difficult to use individual learning than if the environment favors interaction between individuals. Individuals' own abilities to exploit and divide knowledge are also essential. However, because the health care area is highly dependent on individual contribution to the entity, the increased use of information systems requires that an individual can use the systems to increase the productivity and quality of his work. Therefore, the organization has to develop its capabilities in organizational learning and also ascertain that the individual is adopting this culture too.

4.1.7 Process Analysis

Instead of viewing business in terms of functions, divisions or products, it can be viewed as a process. Process can be defined as a structured, measured set of activities designed to produce specific output for a particular customer market. Process implies a strong emphasis on how work is done within the organization, in contrast to a product focus's emphasis on what. There is also a heavy emphasis on improving how work is done in contrast to a focus on which specific products or services are delivered to customers (Davenport 1993).

When using the process approach the organization usually aims to produce value for its customer. Therefore, an important measure of a process is customer satisfaction with the output of the process. To ensure that the customer needs are met and that designing an execution is somebody's response, a process needs a clearly defined owner (Davenport 1993).

Another definition that emphasizes the customer role in the process says that the process is a collection of activities that uses different kinds of inputs and creates an output that is of value to the customer (Hammer & Champy 1993). There is also a definition where the process is divided into three types: core, support and management. Core processes concentrate on satisfying external customers, support processes concentrate on satisfying internal customers and management processes concern themselves with managing the core or the support process, or planning the business level (Ould 1995).

Processes and their renewal have recently been under the spotlight in health care. The cost of producing health care services has increased considerably during the last few decades. Organizations didn't pay enough attention to the effectiveness of work and the costs escalated. Following the collapse of the

economy at the beginning of the 1990s the attention to health care costs increased. The number of employees was reduced and the work had to be conducted by a smaller workforce, which had to be more effective. This led to the second reason for process renewals - the increase in information systems.

It was very quickly noticed that information systems themselves don't bring any cost savings if the old processes are simply transferred to the new system. On the contrary, it makes the processes even more complicated. The processes had to be analyzed and remodeled to achieve advantage from the new systems. The processes were formulated from the patient point of view so that the patient could go through an effective care process that the information systems could support.

An important issue in the processes is how to gather information on a patient and store it so that it can be exploited in all care processes. To work effectively the system should be able to gather information on a patient during the care processes so that there is ever-cumulative information for the use of the health care personnel even throughout the patient's entire life. There are, however, differences between patients and their amount of information. To control this, in some cases, huge amount of information the need for knowledge management together with process analysis is clear.

4.1.8 Sourcing Analysis

It is intuitively apparent that different sources of IT provision together with different contractual focuses and different purchaser/supplier relationships will be appropriate according to individual circumstances. Sourcing of IT is essentially a "make or buy" decision (Finlay & King 1999). From the in-house information management point of view, acquisition encompasses understanding and use of the external IS/IT services market. Particularly critical are decisions on what to outsource and insource, and which external suppliers to use. The source dimension describes the origin of a particular information resource acquired by an organization. This dimension may be thought of as a continuum anchored by the market at one end and the hierarchy at the other. This terminology, derived from transaction cost economics, reflects the fact that organizations may construct/acquire information systems either using resources internal to the organization or resources supplied by external providers. Most are acquired using some combination of internal and external sources.

There are several reasons that researchers have suggested for why firms outsource their IS. These key drivers include financial reasons, such as reducing costs, generating cash and replacing capital outlays with periodic payments. Firms also outsource IS to simplify the management agenda and focus on their core competencies. Technical reasons for outsourcing, such as improving the

quality of IS, gaining access to new talent and technology, and the easy availability of vendors with expertise and economies of scale have also been proposed. “Political” reasons for outsourcing include dissatisfaction with the IS department and the chief information officer, viewing IS as a support function, pressure from vendors, and a desire to follow a trend that has received wide coverage in the popular press (Smith, Mitra & Narasimhan 1998).

The conventional guideline is that all new and strategically important tasks should be performed internally. According to Reponen (1993b), organizations should consider a combination of different alternatives along the spectrum of total outsourcing or insourcing. Organizational decisions should be made consciously and they should be based on the company’s IS strategy.

Another key area discussed in the health care sector is what should organizations outsource? The issues that are especially within the focus of outsourcing are those areas that are not considered core capabilities within the organization, and one of those seems to be information systems. There is, however, a conflict in this thinking. Information and knowledge are considered a key resource in health care and that makes the management of information an important issue: should the patient information be under the direct control and management of the health care organization so that its use is assured? So the care and the treatment are strongly based on information gained from information systems, but, despite that, information systems are not considered a core capability.

One of the reason for this is that health care organizations have only recently started to adopt information systems and there is not yet enough accumulated expertise and traditions to manage them. The lack of expertise has resulted in information systems developing as difficult, complex and expensive entities to control - thus the trend is towards outsourcing. Information systems are seen as a supportive role in health care, which is not necessarily a desirable way of thinking.

An information system very quickly becomes impossible to maintain, especially in small organizations where somebody handles their management with insufficient time and professional skills to conduct the work. In this case the development of an information management strategy might help to organize the management more effectively and focus the resources more appropriately. Another possible solution for a small organization to keep its information systems internal is co-operation with other similar organizations.

4.1.9 Transaction cost theory

Transaction cost theory is based on the fact that there are costs involved in the use of markets. Such costs are operational costs (e.g. search costs) and contractual costs (e.g. costs of writing, monitoring and enforcing contracts). The organization of economic activities depends on balancing production costs against the costs of transacting. However, the paradigmatic question of transaction cost theory is the make-or-buy decision, in which economizing on transaction costs is central (Wang 2002).

The transaction cost approach (TCA) is founded upon the following assumptions (Williamson 1985):

- The transaction is the basic unit of analysis.
- Any problem that can be posed directly or indirectly as a contracting problem is usefully investigated in transaction cost economizing terms.
- Transaction cost economies are realized by assigning transaction (which differ in their attributes) to governance structures (which are the organizational frameworks within which the integrity of a contractual relationship is decided) in a discriminating way. Accordingly,
- the defining attributes of transactions need to be identified, and
- the incentive and adaptive attributes of alternative governance structures need to be described.
- Although marginal analysis is sometimes employed, implementing transaction cost economics mainly involves a comparative institutional assessment of discrete institutional alternatives - of which classical market contracting is located at one extreme; centralized, hierarchical organization is located at the other; and mixed modes of firm and market organization are located in between.
- Any attempt to deal seriously with the study of economic organization must come to terms with the combined ramifications of bounded rationality and conjunction with a condition of asset specificity.

Transaction cost theory is one of the most dominant approaches in evaluating inter-firm contractual arrangements. Mainstream studies in transaction cost theory focus on the tradeoff between the reduced production costs and increased transaction costs of using market procurement (Clemons & Hitt 2004).

With little oversimplifying, the theory basically concerns parties that fail to respect the terms of contract, either because the contract cannot be fully monitored - which allows the party to follow its own objectives - or because the

strategic dependency forces the other party to accept its terms for contract revision in the future. The theory seems to favor means which constrain, punish and reward the potential abuser (Clemons & Hitt 2004).

4.1.10 Summary of different approaches and selection of theory

The health care industry is a strong, though fragmented, industry sector. It has deep cultural and management values based on medical education and professional groups based on professional status. From this point of view, assuming there is a maximum set of values each organization can carry, one could conclude that other aspects of management are underdeveloped, such as general strategic thinking or management of information systems.

Starting from this assumption, eight different conceptual frameworks have been discussed, which could cast light on the management practices of health care organizations in general, and on their IS management in particular. Each of the frameworks or approaches has its strengths and weaknesses, and no particular approach can be said to be superior to the others. The approaches are rather complementary to each other and many are related to each other. However, this summary sums up the approaches and their relationships and briefly reasons the selection of the main theory chosen for this thesis – namely the resource-based approach.

Through stakeholder analysis it is easy to understand that IS implementation in the public sector is a political process, in which different stakeholders have different expectations. The pressure from various political and other stakeholders will have impact, both direct and indirect, on the decisions and progress of the IS projects, and on their strategic effect (Schwartz & Cohn 2002). Stakeholders' false expectations are often the reason for the dissatisfaction (Ryker, Nath & Henson 1997) and they steer the managerial decisions in an ineffective direction. From that point of view, stakeholder analysis could have been a basic approach to this research. Both cases included several stakeholders, and the resistance against the IS project - especially in the second case - was obvious. However, from the resource point of view, stakeholders represent just one resource. Concentrating on just stakeholders would not answer the wider question of how resources should integrate. Although the stakeholder approach is not the dominant approach in this thesis, stakeholders and their effect on the cases are discussed in Chapter 5.6.

Stakeholders' expectations in the public sector are strongly related to scarce financial resources. IS productivity in health care has not been researched very much. Cost-benefit analysis is a basic tool in any kind of project to measure the usefulness of it, but it cannot be used in an orthodox way. Planning horizons,

intangible costs and benefits (Wang et al. 2003), underdevelopment of cost accounting and necessity of certain investments are issues that complicate the use of cost-benefit analysis in health care. From the viewpoint of this thesis, cost-benefit analysis relates to the resource-based approach. The scarce financial resources force the health care area to weigh the cost and benefits of each investment carefully. However, cost-benefit analysis alone in the cases of this thesis would not bring useful results. Both cases were in the first stages of using IS and to sort out the benefits would have required a more longitudinal-oriented research. There were sometimes difficulties in finding even the investment cost, not to mention the intangible costs. However, like in the IS field generally, health care IS will also increasingly need cost-benefit discussion in the future.

The competitive advantage approach has not gained much popularity in public health care. Even though the legislation has been changed to encourage municipalities to seek cost-effectiveness by comparing different service providers, the effects are still quite low. It was hoped that the public health care providers would become competitive by specializing more and acquiring other services from other public providers. However, it seems that the public sector just acquires some complementary services from the private sector and competition between public organizations does not happen. Therefore, although there are lots of expectations for competition, especially from the government level, the competitive advantage approach is not discussed in this thesis, even though competitive issues are closely related to the resource-based approach.

Knowledge management in health care could have a strong role, especially since the area includes masses of tacit and explicit knowledge. Health care has traditionally been a handicraft profession, although based on high professional knowledge, but the combination of technology and human judgment is increasing all the time. On the one hand, IS increases the possibilities to manage information internally but on the other hand the development of IS expands and complicates the environment of a single organization. Integrating knowledge management with strategic IS planning in health care would especially contribute to problems of distributed information in organizations' internal and external environments. With more centralized knowledge management, the possibilities to use that knowledge for analysis and management purposes, and for evidence-based medicine, would grow (Bose 2002). Knowledge is definitely one of the most important resources in a health organization and though it is not selected as a theory in this thesis it is also included in the discussion on the resource-based view.

New information is born daily in the interaction with patients, colleagues and other organizations. For any health care organization, the crucial core competence is to catch and learn from this information. Introducing a new information system into am organization is an ongoing and endless process with

numerous contacts internally and externally, which creates learning. Issues such as organizational culture and change management become crucial. The organizational learning approach would be an ideal theory to use in health care now, when the systems, and especially their effective use, is in the early stages. IS projects can enhance project expertise but they can also have a deeper and, in a way, sustained impact on organizational learning skills and methods. Such issues were not an interest in the case organizations of this thesis and the learning approach alone did not serve the goals of this research. However, learning issues are included in the discussion on the resource-based approach and will be discussed in that section later.

One may say that without understanding and documenting current processes, you cannot start implementing them in the information system. Many IS projects in the health care field are greenfield projects starting from scratch, and a basic process analysis should be conducted. In some cases the process is already further ahead and different versions and improvements to current processes are already emerging. Process analysis puts stress on the fluent flow of material, and patients, through the production system. Here one can of course question whether this approach, having its roots in manufacturing industries handling physical objects, offers the correct metaphor for handling humans. The approach might work well for supporting initial patient handling procedures installed in an information system, but it does not support the need for comprehensive and deep collection of data on the patients. In this respect the knowledge management approach is a much needed complementary approach to the process analysis approach (Suomi et al. 2000b). Process analysis should be conducted in the early stages of IS acquisition. In the cases in this thesis it had not been conducted but was in the future plans. Since the implementation of these plans was not clear, process analysis was left aside. Therefore, it is not discussed in detail in this thesis either.

There are two big trends that make sourcing decisions increasingly important. First, the scope and scale of medical treatment is growing all the time and not even the biggest organizational units can handle all the required care components, or at least not in an economical way. Services have to be bought from experts. The second reason is the constant discussion on and trend towards privatization of services. As public health care activities are outsourced, theoretical support for this is also needed. As such, outsourcing certain activities is not bad, but outsourcing needs new kinds of control mechanisms. Sourcing decisions played a central role in both cases of this thesis but, with little exaggeration, the desired outcome was near to the phrase “out of sight, out of mind”. Although outsourcing was a central part of both case organizations, and in our research report to them, it was not selected as a main theory in this thesis. The main reason for this is that the approach would not have given the answer to

the possibilities of integration IS and other resources; the approach might have driven the research more in the direction of administrative and contractual issues than the exploitation of IS.

Transaction cost theory emphasizes the alternatives in purchasing services or products, and the problems therein. The alternatives in the make-or-buy decision should be evaluated, which, in the public sector, is receiving close attention at the moment. Since the interest in outsourcing is high in the sector, the opportunistic costs in inter-relationship agreements have to be considered. Transaction cost theory offers a viewpoint in considering different options and opportunistic costs when choosing the correct form of action.

From the short summary of the approaches above, there are different aspects in each of them, which, in order to become materialized, need the identification of resources. Those aspects are presented in Figure 6. Therefore, it seems that the resource-based theory is an approach to which several different viewpoints can be attached. First, the stakeholders decide the use and acquisition of the resources, and their understanding, professional skills and expectations should be considered. Second, in the current situation, where public financial resources are scarce, the investment costs and the benefits are the key issue. Third, the basic idea of the resource-based approach is to achieve sustained competitive advantage by finding the most valuable resources in the organization. Competitive advantage can be translated in health care to mean the sustained and superior performance at which the competitive advantage through superiority and sustainability is aiming. Fourth, expansion of the environment of the health care units, both internally and externally, and progress in medicine and IS sets new demands for the information and knowledge management resources. Fifth, individual and organizational learning in the current situation, where IS is still a fairly new area in health care, should be exploited. Organizations have now possibilities to create clear methods how learning from different processes could be structured and reused in further projects and processes. Sixth, IS should save other resources by automating and compensating some processes, and releasing staff to core services. Process renewal is also in the early stages and needs a thorough reorganization of the processes and underlying assumptions. Seventh, sourcing decisions will increase in future and managing them is going to be the main issue. Thus outsourcing will need new resources and management structures and skills because, until recently, outsourcing has not been very popular in any field of the public sector.

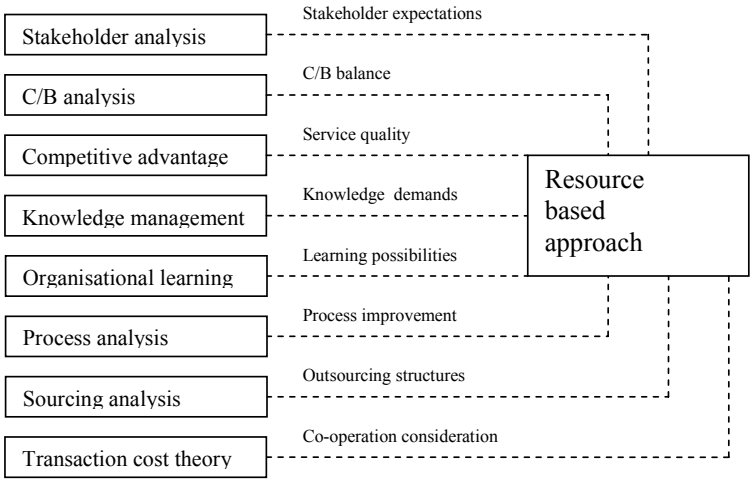

Figure 6 Relationship of different approaches to the resource-based approach in this thesis.

The resource-based approach can be regarded as an approach that is affected by the different resources of different approaches. No doubt each approach also includes several other dimensions than are brought out here, but this set of approaches is a meaningful way to stress important issues. There are also other approaches that are not included in the list, like customer relationship management and the transaction cost approach, but it is impossible to include every existing approach. The chosen approaches include issues that, according to the scientific and professional literature and public discussion, are popular in public health care at the moment.

The empirical findings of this thesis show that health care sector managers and the political decision makers above them at the municipality and State levela make far-reaching decisions about organizing health care and its information management functions without much business-like strategic thinking and direction behind them. The approaches that were included in this chapter - such as the competitive advantage approach, the resource-based approach, the organizational learning approach and the knowledge management approach - focus more on long or mid-range improvements and survival of the industry in the long term. Therefore, they should be introduced more in the health care sector. There is a strong fear that if information systems and knowledge are not understood in the health care industry as sources of sustained effectiveness and quality improvements, parts of the most important resources and competence, and a stimulus for organizational learning, but are merely regard as costs to be outsourced and supporters of basic routine operations, the industry is going to head towards decline.

4.2 Selected theory: resource-based approach

The basic features of the resource-based approach will be presented in this chapter. It is first presented with no special attention to IS but discusses the kinds of development process resources within organizations that are recognized and used to connect the process and resources to public health care. The strategic aspect of the approach is explained first. This is needed to better understand the underlying strategic impact the approach has on the management of organizations and on the approach of this thesis. After this, the approach and IS as a resource are discussed.

4.2.1 Strategic management and resources

There are numerous definitions of strategic management and it is not in the interest of this research to make any deeper analysis or list of those but just to give a few samples. The main emphasis of this chapter is to connect the organization's strategy and strategy development to the resource-based approach and to stress the importance of identifying which resources the organization needs in its strategy process. The strategy development is closely related to the organization's existing and new internal, as well as external, resources, which it can acquire and exploit. First, some definitions about the strategy and its relationship to the resources is presented.

The roles of the managerial skills in realizing the strategies are emphasized in several definitions of the parts of the organization's strategy. For example, in researching the resource-based view, Hansen, Perry and Reese (2004) discuss the role of managers in managing administrative resources. According to them, the administrative resources reflect the quality of the administrative decisions, which ultimately affect the firm's performance. Barney discusses the results of the strategy and links the organization's strategy and performance so that the impacts of the firm's strategies are evaluated on the basis of its performance. He explains the firm performance with two value criteria: the firm's actual value and its expected value. The results show that the more expectations there were, the more the firm created value (Barney 1996).

Thus the strategy and resource concept are inter-related. The term strategy is often used by economists to mean the allocation of scarce resources necessary to reach the goals (Learned, Christensen, Andrews & Guth 1969, p. 15; Chandler 1982, p.13). In the extensive literature of strategic management the discussion of aspects, which should be included in strategies, emphasizes selection and prioritization of a variety of elements. The concept of strategic management is

often called “policy” or simply “strategy” (Rumelt, Schendel & Teece 1994, p. 9).

It seems that there is no comprehensive and unanimous definition of the strategy concept (Chaffee 1985) but the content is always organization-contingent and each strategy is unique (De Wit & Meyer 1999, p. 9). However, the basic assumption of the content is that it only includes issues that have strategic value for the organization and that the parts in the strategy can be integrated. Only the integration of the parts makes the content strategic (Rumelt et al. 1994, p. 9).

The outcome depends on its long-term objectives, management style, organizational culture, strategy decision and implementation processes, environmental situation and administrative structure (Chaffee 1985; Hax & Majluf 1988). The literature on organization strategy is mainly divided into three strategy dimensions: process, content and context (De Wit & Meyer 1999, p. 6-7).

In his discussion on the classical approach to strategy formulation, Porter (1980) defines the relationship of goals and key operating policies (functions like sales, marketing, R&D and manufacturing) with which the organization tries to achieve the goals. The interaction between goals and operating policies, as well as the interaction between each operating policy, has to be clearly defined and consider both internal and external factors. The behavior of the firm in competitive markets largely depends on the management’s ability to use those interactions (Learned et al. 1969, p 16; Porter 1980 xvi-xvii).

The approach Porter uses includes quite concrete policies, where most of the strategy definitions are wider. On the basis of their literature review, Hax and Majluf (1988) list six dimensions the strategy concept should include in order to offer certain unity, direction and purpose, and facilitate change in the organization. Broadly defined, they are a pattern of decisions, organization purpose in terms of long-term objectives, competitive domain, organizations economic and human content, competitive advantages, definition of the organization’s hierarchical level relationships and relationship to stakeholders. The strategy should act as a framework in asserting its continuity and adaptation to its environment (Hax & Majluf 1988).

In his research on corporate strategy, Andrews (1987) stresses similar aspects. He distinguishes the corporate strategy and the business strategy, where the former covers the whole organization and latter defines the choice of an individual product or service inside the organization. The corporate strategy covers the pattern of decisions on issues like the organization’s objectives, policies and plans to achieve those objectives, the area of business it wants to be in, the nature of the human and economic contribution, and the contribution to its shareholders, employees, customers and community. Chaffee (1985) also stresses

the stakeholder and, especially, their commitment and says that a strategy can act as a metaphor or frame of reference to motivate the stakeholders to believe and act in such a way as will enhance the organization's results.

Rummelt et. al. (1994, p. 9) add things like choice of an appropriate level of scope and diversity, the products and services to offer, administrative systems and policies used to define and coordinate the work.

A classical way to approach the strategy content and context is to look at it from the viewpoint of success (Nurmi 2000, p. 46). De Geus (1997) has studied the success of companies that have survived for a long time and found four common areas: ability to react to the environmental changes, conservatism in financing, awareness of the organization's identity and tolerance of new ideas.

Nurmi (2000) remarks that success is also a matter of priorities. With prioritization, the organization defines what kind of long-term plans the organization is going to define and whose goals and interests it is going to stress. Prioritization can put forward customers and employees or owners and shareholders. The former stresses a strong financial structure and the latter profitability and growth (Nurmi 2000, p. 47). Prioritization becomes crucial in distributing and using scarce resources.

Although the concept of strategy does not have a settled definition and the content is unambiguous, it seems to include very similar but wide-ranging aspects like the organization's competitive position, relationship to stakeholders, external and internal environment, human and economic issues, the organization's mission, etc. It also seems that each individual aspect of a strategy is wide and can include several details, but each includes some specific, organization-dependent knowledge in order to become strategic.

However, there have been some changes in the focus and scale of questions with which strategies are conceptualized, both in academic and in managerial practice. The previous very wide questions of "what business are we in" or "what is our corporate mission" has changed to somewhat narrower questions like "which are our central resources" or "how can we develop new competencies or capabilities" (Foss 1998). Basically, strategic management tries to understand the sources of sustained competitive advantage (Mata et al. 1995) and, therefore, the change to a more practical approach in strategic management might be needed.

Foss also explains that the collapse of interest in strategy and disappointments in strategic tools to generate expected benefits at the end of the 1970s helped the resource-based approach to gain popularity. The long-range planning and ambitious goals were replaced with a more introverted tendency. Foss calls new practices like Business Process Reengineering (BPR) and Total Quality Management (TQM) a new, more introverted stance. The more introverted stance resulted in organizations emphasizing their individual strengths instead of extensive scenarios and attempts to gain market share at any price (Foss 1998).

Figure 7 presents a framework that has been widely used in the strategic management field since the 1960s. It shows how an organization can achieve sustained competitive advantage with strategies that develop its internal strengths and exploit external opportunities. At the same time, it should strengthen its internal weaknesses and avoid external threats. Although the framework presents the internal and external dimensions in strategy development, the research on competitive environment has mostly focused on the organization's external opportunities and threats (Barney 1991). For example, Porter's five forces model presents the characteristics of an attractive industry and notes that opportunities will be bigger and threats will be smaller in this kind of industry (Porter 1980).

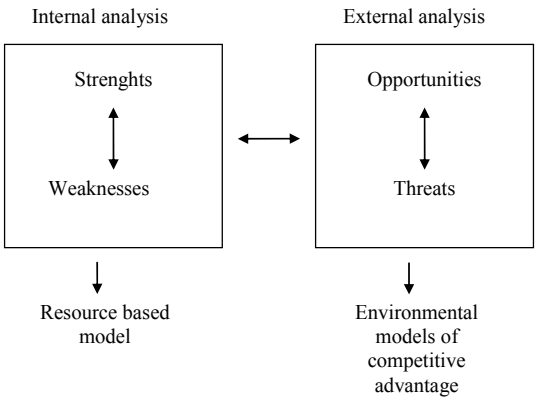

Figure 7 The relationship between traditional "strengths-weaknesses-opportunities-threats" analysis, the resource-based approach and models of industry attractiveness (Barney 1991).

There are two basic assumptions the resource-based approach leans on in analyzing the sources of competitive advantage and where it fundamentally differs from earlier external and environment-centered research. First, the strategic resources the organizations possess are heterogeneous within some industry. Second, the heterogeneity may be long-term since the resources the organization possess are not perfectly mobile across organizations (Barney 1991).

4.2.2 Development and definitions

The resource-based approach appeared in its present form in the 1980s (Foss 1998) but the origin of the approach can be considered Edith Penrose's theory of

the growth of the firm (Kangas 2000, p. 60). In the theory she defines an organization's resources in relation to the services the organization produces and emphasizes the internal origin of the resources. She defines the primary economic function of a firm as being to exploit its productive resources to supply goods and services to the economy according to the plans developed and put into effect within the company. She discusses the physical resources and distinguishes them from tangible resources (plant, equipment, land, raw materials, etc.) and human resources (unskilled and skilled labor, clerical, administrative, technical, etc.). She claims that the resources are not the inputs in the production process but the services the resources can render. Resources can be used in different ways and amounts, and with different combinations with other resources to create different services or sets of services (Penrose 1968, p. 24-25). The difference between resources and services is that resources can be defined independently of their use while services cannot, since the concept of service implies some action or function. This distinction between services and resources is important when discussing the uniqueness of each individual organization. The skill of identifying and exploiting bundles of resources to create unique services or a mix of services becomes crucial when striving for effectiveness and quality (Penrose 1968, p. 24-25).

Figure 8 presents the development of the resource-based approach. The development is in clearest in the move from the purely competitive phase to the sustained competitive phase.

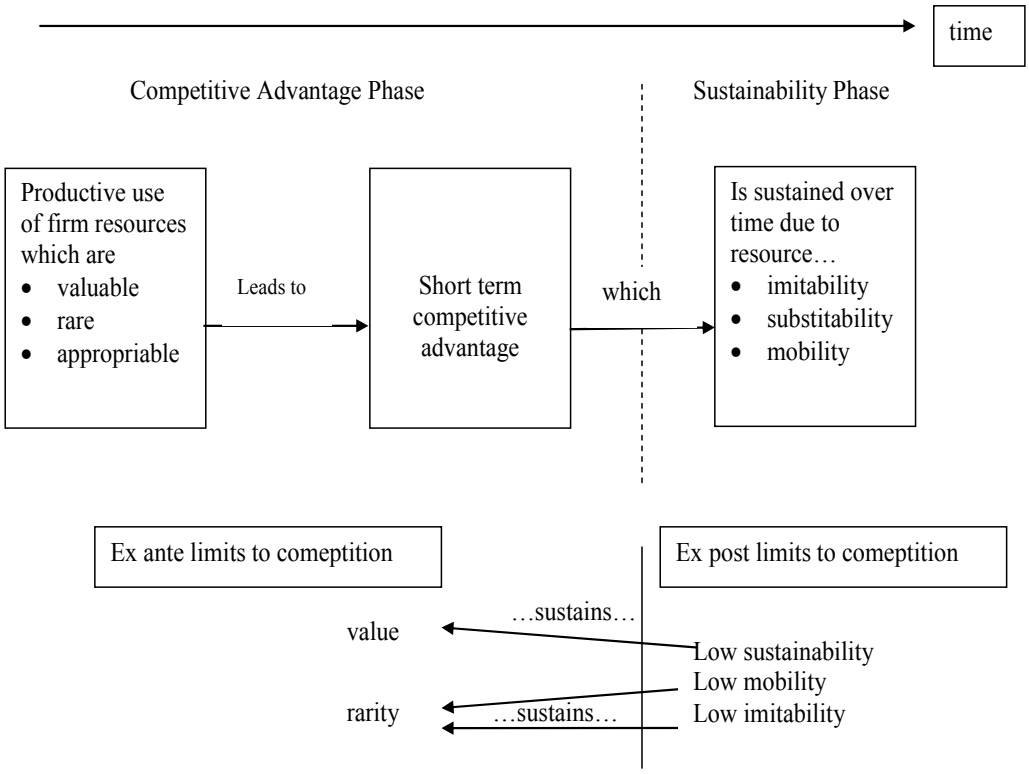

Figure 8 The resource-based view over time (Wade & Hulland 2004).

Resources are defined in traditional strategy research as strengths that the organization uses in developing and improving its strategies. Barney (1991; 1996) defines resources as including all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc., controlled by the organization. Those resources enable the organization to improve its effectiveness and efficiency. There are also several other definitions of resources, from which Barney combines three classes. First, physical capital resources include the physical technology, plant and equipment, geographic location and access to raw material. Second, human capital resources include training, experience, judgement, intelligence, relationships, and managers and workers conception's of the organization. Third, the organization's capital resources include the organization's formal reporting structure, formal and informal planning, controlling and coordinating systems, and formal and informal relationships within the organization and between the organization and its environment. How these resources affect the organization's performance

depends on how it can choose, implement and exploit the correct resources; otherwise, some resources can even reduce the organization's effectiveness.

One of the basic assumptions in the resource-based approach is that the organization should possess some specific resources that are exploited in an organization-specific and non-imitable way (Barney 1991; Amit & Schoemaker 1993; Short, Palmer & Ketchen 2002; Wade & Hulland 2004). The concrete and visible resources, usually measured in money or machinery, can be imitable but the underlying and tacit knowledge on how the organization utilizes those resources, and the learning process behind it, should not. To achieve such advantage the organization should define the major long-term goals it wants to achieve and the resources needed in the strategies it needs to end up at those goals.

The resource-based approach concentrates on how resources and the organization's capabilities can affect the business strategy and provide a focus for strategy formulation (Andreu & Ciborra 1996). Briefly, the resource-based approach claims that an organization's performance is about obtaining and deploying unique assets (Short et al. 2002), and the exploitation of those assets differs between organizations. This difference in performance is actually one of the main questions in the resource-based approach (Hoopes, Madsen & Walker 2003).

The resource-based approach is described by Amit and Schoemaker (1993):

"*For managers the challenge is to identify, develop and deploy resources and capabilities in a way that provides the firm with a sustainable competitive advantage and, thereby, a superior return on capital."*

The identification, development and deployment are the key factors in the struggle for competitive advantage. The three functions have to proceed before any of the resources can contribute to the organization's outcome and position. So the superior return on capital is only the goal a profit-oriented organization sets, and in some other environment the goal could be defined differently.

Andreu and Ciborra (1996) emphasize the importance of combining internal and external resources in creating a firm's capabilities. The core capabilities are those that create sustained competitive advantage for the firm. They differentiate a company in terms of beneficial behaviors that cannot be seen in its competitors. Andreu and Ciborra's definition of core capabilities is very comprehensive:

"*Core capabilities develop in organizations through a fundamental transformation process by which standard resources, available in open markets, are used and combined, within the organizational context of each firm, with organizational routines to produce capabilities, which in turn can become core and the source of competitive advantage.*" (Andreu & Ciborra 1996).

The transformation process is organizational-dependent and is based on certain context and routines; therefore the results are also dependent on them.

When the change process advances, so the dependency on the organization increases. Thus the transformation is a path-dependent learning process and the specificity degree of core capabilities is high.

The definition by Andreu and Ciborra does not emphasize the goal measured in capital, but in gaining advantage in a competitive market. Their definition also emphasizes the process of searching for organization-specific resources, though the goal of the process is competitive advantage. Again, if only concentrating on the process and forgetting the goal, the definition can also be used in other than competitive environments.

The internal viewpoint of resources emphasizes that the resource-based approach assumes that a firm's competitive advantage lies in the groups of service-creating resources that can be exploited. It does not lie so much in the product market combinations chosen for the deployment of these resources. By focusing on the internal resources, the resource-based view is trying to combine the organizational resources analysis and capabilities with environmental opportunities and threats analysis (Barney 1994; Kangas 2000, 70).

The key concepts in the resource-based approach seem to be competencies and capabilities, and their relationship to resources. Foss (1998) offers the criticism that there is considerable ambiguity in defining and using these concepts. However, Prahalad and Hamel (1990) and Markides and Williamsson (1994) define competencies and capabilities so that organizational competencies refer to the unique knowledge the organization possesses. Organizational capabilities, again, refer to the organization's ability to use those competencies. The core competencies of an organization are those basic skills the organization must possess in order to survive in the markets.

According to Kangas (2000), organizations should concentrate on some determined core competencies that comprise unique skills, knowledge and resources. The creation of an organization's core capabilities comprises the existing resources, organizational context and learning process in the organization (Kangas 2000, 60-74). Resources such as brand, patent or license are observable but not necessarily tangible, and they can be valued. Capability, again, is usually not observable and thus intangible, cannot be valued and change only happens as part of its entire unit (Hoopes et al. 2003).

McEvily and Zaheer (1999) define competitive capabilities so that economic action is embedded in the firm's network of ties, including non-market ones. They see that the firm's actions and outcomes are substantially influenced by the ongoing pattern of relationships maintained with other firms and non-market organizations. Firms vary in terms of their potential to discover and exploit competitive capabilities through their networks and it is important for an organization to find its own links between competitive capabilities and external possibilities. The organization should not only concentrate on the link between

capabilities and performance-related outcomes but also on the sources of the capabilities.

Therefore, the decision on the kind of content the organization's strategy is going to have depends on what resources the organization has or is going to create, and on what basis and from which sources those resources are selected, developed and mixed with other resources. This was the starting point in De Wit and Meyers' (1999) research, who relate the selection of resources to the decision on the kind of approach an organization chooses in defining its strategies at the corporate level. They find two perspectives: outside-in and inside-out. Both approaches agree that the organization should find a balance between the external and the internal environment but the difference comes from how the organization achieves such a fit. The former emphasizes that the organization should take its external environment as a starting point in its strategy definition and the latter that organization's strategy should first concentrate on strengthening its internal resources. The development of resources in the outside-in approach is externally oriented and market driven. Therefore, the approach emphasizes that the company's resource development should adapt to the external environment. The inside-out approach stresses the role of first strengthening and seeking such internal resources, which are difficult to imitate and thus a source of competitive advantage. The starting point in resource development in the inside-out approach is the organization's intangible resource base. Such resources are often unique, competence and capabilities-based and have developed over a long time.

The development of organizational-specific resources and core competencies and capabilities is also connected to organizational learning. Some researchers have criticized the approach and suggested that in order to move from analyzing just existing competencies the resource-based approach should move its focus to related fields like innovation and technologies, and organizational learning (Foss 1998).

The learning process should be path-dependent, with which organizations can improve its competitive position. The process should concentrate on the core capabilities and create them as organization-dependent (Andreu & Ciborra 1996; Kangas 1999).

Figure 9 presents the development of core capabilities through learning loops. The first loop routinizes work practices using resources; the second loop combines work practices and organizational routines, which together form capabilities; and the third loop gives meaning to the capabilities and identifies core capabilities in the organization's environment and business task (Andreu & Ciborra 1996). Although the strategic loop is described in the competitive environment, it could as well be replaced with "challenging environment" or "problem laden environment". However, the issue is that the environment

requires development of even more effective ways to answer its requirements and thus core capabilities have to be developed.

The learning loops unfold spontaneously and develop depending on the individual and group understanding of the environment, the business mission and even their own learning abilities. The management should focus on actions that give the learning process the appropriate direction at a certain time (Andreu & Ciborra 1996).

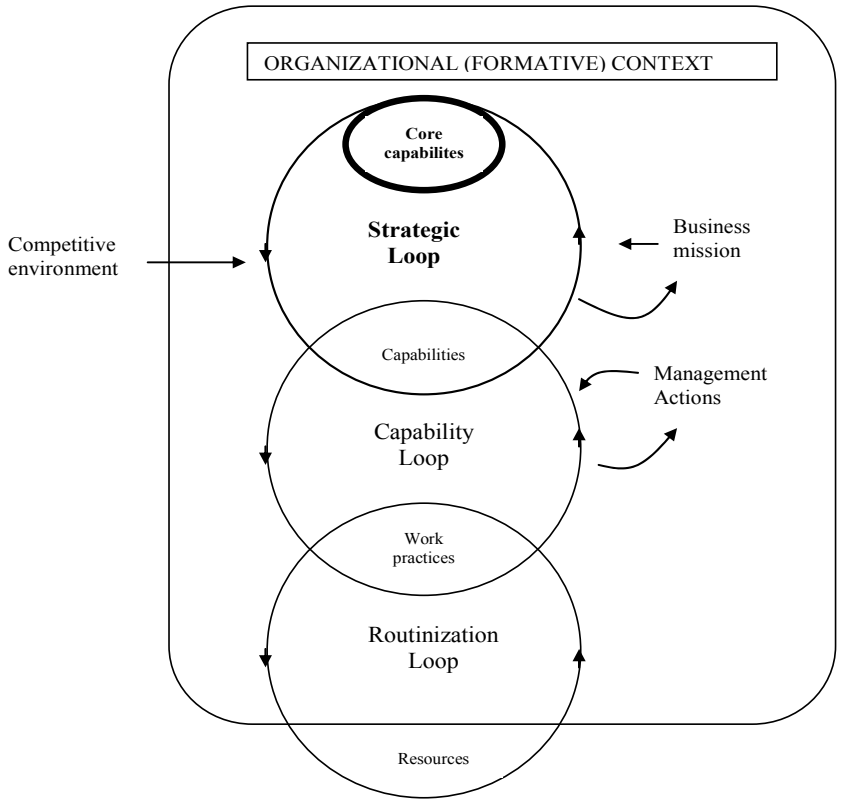

Figure 9 Basic learning process in the core capabilities formation process (Andreu & Ciborra 1996).

Argyris and Schön (1978) explain that organizational learning takes place in the dynamic single and dynamic double loop learning. Learning creates organizational competencies and capabilities. Kangas (2000) couples the learning loops and capabilities in the following way.

Single loop learning: Dynamic single loop learning processes the coordinating and leveraging organizational processes into competencies without qualitative changes in the existing stock of assets and capabilities. Single loop learning only changes the way the organization is acting, not the underlying assumptions.

Double loop learning: Dynamic double loop learning processes the co-ordinating and building competencies with qualitative changes in the existing stocks of assets and capabilities. Double loop learning changes the way of acting as well as the underlying assumptions. In resource-based approach research, several researchers have identified a set of attributes that might conceptually influence an organization's competitive position. Although organizations possess numerous resources, only a few of them have potential to lead the organization to a position of sustained competitive advantage. According to the approach, these attributes should all be present in order to achieve sustained competitive advantage (Wade & Hulland 2004).

Amit and Schoemaker have defined attributes, which are, as they write, "*desired characteristics of the firm's resources and capabilities*". These are complementarity, scarcity, low tradeability, difficult imitability, limited substitutability, appropriability, durability and overlap with strategic industry factors (Amit & Schoemaker 1993). Similar typologies have been presented by (Black & Boal 1994; Collis & Montgomery 1995) and Barney (1991). Next, Barney's typology is presented in more detail.

One of the most fundamental frameworks in the resource-based approach has been Barneys VRIO framework, according to which, an organization can identify its core capabilities and resources through focusing on four specific questions, (Barney 1991). Since it was published the framework has acted as a footing for a great deal of research on the approach (Priem & Butler 2001). The framework is based on the basic axioms of the resource-based approach - namely that resources are distributed heterogeneously across firms and that these production resources cannot be transferred to another firm without costs. The framework can be used for analyzing the organization's competitive position. Figure 10 illustrates the framework's relationship to the basic assumptions of the resource-based approach and to sustained competitive advantage, and suggests the kind of empirical questions that should be presented in order to understand which of the organization's resources are sources of sustained competitive advantage. According to Barney (1991), the resources should be:

- valuable
- rare
- costly to imitate
- efficiently organized.

Valuable: The resource is valuable for the organization when it exploits opportunities and/or neutralizes threats in a firm's environment (Andreu & Ciborra, 1996; Barney, 1994; 1991).

Rare: The resource is rare when the number of organizations possessing a particular capability is less than the number needed to generate perfect competition in an industry (Barney 1991; Andreu & Ciborra 1996).

Costly to imitate: The resource can be costly to imitate because of unique conditions in its acquisition process, because the link between the capability and sustainable advantage is causally ambiguous, or because it is socially complex (Barney 1991; Barney 1994; Andreu & Ciborra 1996).

Efficiently organized: The resource is efficiently organized if it can support it's valuable, rare and costly to imitate resources and capabilities (Barney 1994). The organizational arrangements should be such that they support the existing resources. The organizational arrangements have a close relationship to the management and organizational resources. The managers are those who enhance mutual trust, reduce monitoring costs and enhance the search for new opportunities (Barney 1991; Kangas 1999).

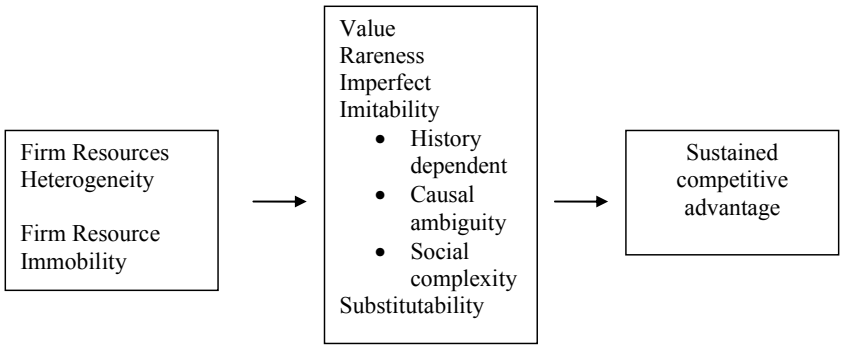

Figure 10 The relationship between resource heterogeneity and immobility, value, rarity, imperfect mobility and sustained competitive advantage (Barney 1991).

Broadly defined, resources can be said to include not only specific assets but also individual human competencies and intangible abilities. The managers' job is to gather resources that are valuable, rare, without substitutes, and bundled in such a way that the organization's resources, and thus strategies, are in the most effective form (Short et al. 2002).

Barney also suggests that a resource-based approach in emphasizing heterogeneous and immobile resources increases the social welfare (Barney 1991). The social welfare and perfectly competitive industries are grouped together in industrial organization economics. Perfectly competitive industries use their resources in the most effective way and create social welfare instead of wasting resources or using them ineffectively. Strategy theorists often focused on the environmental determinants of organization performance and social welfare concerns were left aside at the cost of developing imperfectly competitive

industries where a single organization can gain competitive advantage (Porter 1980). The resource-based approach, in assuming that the organization's resources are heterogeneously distributed and immobile, emphasizes that the organization that seeks and uses its best and unique resources is acting in the most effective and efficient way. The higher levels of performance that accrue in a firm with resource advantages are due to the efficiency of these organizations in exploiting those advantages rather than to the organization's efforts to create imperfectly competitive conditions in a way that fails to maximize social welfare (Barney 1991).

The previous viewpoint in which the organizations are using their resources to act in the most effective and efficient way also fits organizations where competitive advantage is not the focus but maximizing the use of the resources is. Public health care is trying to cope with resources that are mostly scarce, and thus has to use the resources as effectively and efficiently as possible.

4.2.3 Criticism of the resource-based approach

Like in any theory, there is also some criticism of the resource-based approach. In discussing the appropriateness of the resource-based approach for strategic management, Priem and Butler (2001) remark that *"Periodic critical examinations of the ideas underlying fashionable research genres might be warranted to ensure maximum returns from research effort. This might be particularly true for developing academic fields such as strategic management."*

The critics are mainly concentrating on the link between the approach and its empirical testing and findings, and its focus to internal resources. It is said that discussion on the resource-based approach has been lively but the empirical research has been low. Therefore, systematic falsification of the approach is difficult (Hoopes et al. 2003). On the other hand, Foss (1998) says that testing the approach is difficult, but possible, and that empirical tests have been done.

However, Foss also criticizes the fact that the discussion on the approach mostly concentrates on analyzing existing and static resources, while it should concentrate on more dynamic and evolutionary issues like innovation and technology research, and research on organizational learning. He says that there has not been a well-developed model for endogenous resource creation (Foss 1998). Foss's arguments are parly false since Argyris and Schön (1978) and Prahalad and Hamel (1990) have discussed the role of innovation and learning in increasing an organization's competencies.

According to Foss (1998), to develop shortcomings, the approach should cooperate with evolutionary economy, which has created high understanding of the mechanisms of technological change. The cooperation could help to build a

more refined resource-based analysis of the environment and increase the understanding of the process of creation of new resources through innovation. Foss also suggests other perspectives that could enhance the development of the resource-based approach in a more dynamic direction, like real options, path dependency, organizational learning, complementarities and innovation studies and technology management.

Priem and Butler (2001) go even further in their criticism, namely to fundamental questions of what is theory and what is strategy. They criticize the applicability of the approach as a theory in general and its lack of contribution to strategic management. According to them, the contribution of the resource-based approach to strategic management largely depends on how it can become a theory of competitive advantage. They evaluated the arguments of the approach against the generally accepted criteria that can classify a set of statements as a theory. They conclude that the present resource-based approach does not meet the requirements of the empirical content criteria required of a theoretical system, but, on the other hand, that conceptual work originating from a resource perspective can be a theory (e.g. contingency theory developed in the context of a firm's resources).

To overcome these problems they suggest several improvements and new focuses for the resource-based approach. They discuss both internal and external conditions, production and demand, and product and resources, and suggest that the resource-based approach should include more external, environmental demand models instead of emphasizing mostly internal resources and production. The match between internal and external resources and organizational capabilities is one of the central issues in strategic management, thus the management job is to find or create this match (Priem & Butler 2001).

Next, they suggest that the concept definitions and concept interrelationships, as well as the interrelationships among the statements, should be additionally developed further and re-evaluated against the requirements of the theory. The development and evaluation process should be repeated as many times as necessary to clarify the definitions and interrelationships. However, the basic axioms underlying the approach, like the fact that resources are heterogeneous and not perfectly mobile, are defined clearly enough (Priem & Butler 2001).

At present, the approach is more explanatory while the strategy discipline emphasizes the prescriptive dimension. Priem and Butler claim that the resource-based approach should more precisely answer the "how" question, like how the resources can be obtained, how it contributes to the competitive advantage and in which contexts, and how it interacts with other resources. The aim should be that the resource-based approach could offer meaningful prescriptions for the practitioners and for the researchers. Through that, the behavioral aspects could be ultimately included in the research done on the basis of the approach. For

example, causal relationships between actions and competitive advantage can be better understood by managers with meaningful prescriptions (Priem & Butler 2001).

Lastly, they highlight the role of the firm's history in describing how and why some resources have risen above others over time, and call this a temporal component. Understanding this could provide a deeper understanding of the complex interactions that happen between the organization's resources and its environment. Topics could be, e.g., how the organization's resources and capabilities are accumulated and eroded over time and how the changes in the markets affect the relative value of the resources (Priem & Butler 2001).

4.2.4 IS and the resource-based approach

So what is the role of IS in this context? As such, the theory is useful to IS research. It is a valuable theory for IS researchers to consider how IS relates to a firm's strategy and performance. It gives an important framework for evaluating the importance of the strategic value of an IS resource. It provides guidance on how to differentiate the various types of IS and how to study their separate influence on performance (Santhanam & Hartono 2003). The theory also provides a basis for comparison between IS and non-IS resources and can thus facilitate cross-functional research (Wade & Hulland 2004).

There are, however, some issues that have to be considered when discussing IS as a resource and which contribute to the sustained competitive advantage. Barney, for instance, questions the claim that information systems are a source of sustained competitive advantage (Barney 1991). As such, any strategy that exploits just the machines (computers) themselves is likely to be imitable and thus not a source of sustained competitive advantage. IS as a resource seldom has a direct influence on sustained competitive advantage but primarily forms part of a complex chain of assets and capabilities that may lead to sustained performance. This is done through a complementary relationship with the organization's other assets and capabilities (Wade & Hulland 2004). IS resources are necessary but not sufficient alone (Clemons & Row 1991). The effects and use of individual and firm-specific resources on performance are therefore more significant than the technology itself (Mahoney & Pandian, 1992).

There are several studies which stress the different sides of IS as a resource. Andreu and Ciborra (1996) suggest four guidelines if IS is to play a key role in making core competencies and capabilities really count for a firm:

- Look out for IT applications that help to make capabilities rare.
- Concentrate on IT applications that make capabilities valuable.
- Identify capabilities that are difficult to imitate.

- Concentrate on IT applications with no clear strategically equivalent substitutes.

Mata et.al. (1995) discuss the impact of four IS resources in gaining sustained competitive advantage: access to capital, proprietary technology, technical IT skills and managerial IT skills. They ended up concluding that managerial IT skills is the only one that leads to sustained competitive advantage. In their conceptual work, Andreu and Ciborra (1996) describe the role of IT in creating competencies and capabilities within the context of organizational learning. Bharadwaj, Bharadwaj & Konsynski (1999) studied the formation of an IT capability construct with six elements: IT business partnership, external IT linkages, business IT strategic thinking, business process integration, IT management and IT infrastructure. Feeny and Willcoks (1998) describe nine core IS capabilities that are organized into four categories: business IT vision, delivery of IS services, design of IT architecture and core IS capabilities. Capabilities are mapped onto skills and values.

Although these studies stress different sides of IS resources, several similarities are repeated. Management and human skills as resources are one, which are repeated in most definitions. This emphasizes the role of organization dependency and intangible resources mentioned earlier.

Broadly defined, these studies divide IS resources into two categories: technology-based IS assets and system-based IS capabilities. IS assets seem to be the easiest resources for competitors to copy and thus give only short-term competitive advantage. Deployment of IS capabilities with intangible assets are the most difficult to imitate and thus give better competitive advantage (Day 1994; Christensen & Overdorf 2000; Wade & Hulland 2004).

Wade and Hulland (2004) have gathered an extensive list of IS resources from previous research and categorized them into eight key IS resources using Day's (1994) framework (Table 1). Day argues that capabilities held by an organization can be sorted into three types of processes:

- Inside-out: deployed from inside the firm in response to market requirements and opportunities. Internally focused (e.g. technology development, cost control).
- Outside-in: placing an emphasis on anticipating market requirements, creating durable customer relationships and understanding competitors. Externally oriented (e.g. market responsiveness, managing external relationships).
- Spanning: needed to integrate the firm's inside-out and outside-in capabilities. Internal and external analysis (managing IS/business partnerships, IS management and planning).

Table 1 Eight key IS resources (Wade & Hulland 2004)

Outside-in	• external relationships management • market responsiveness
Spanning	• IS business partnerships • IS planning and change management
Inside-out	• IS infrastructure • IS technical skills • IS development • Cost-effective IS operations

The framework of Wade and Hulland emphasizes resources that are mostly intangible and related to management and human skills and knowledge, and thus are firm-specific. Even when they discuss technical skills they point that such skills not only include current technical knowledge but also the ability to deploy, use and manage that knowledge. As mentioned earlier, pure implementation of technology or routine use of technology is not a resource in a way mentioned in the resource-based approach. IS has to be developed and used in co-operation with other resources, which it can create as essential resources and can make IS a core resource. This framework also fits well with this thesis since in describing the most valuable IS resources from earlier research it also points to those factors that can hinder IS investments becoming a core resource of a health care organization. Although the phenomenon discussed in this thesis is narrower in scope, the findings from earlier research indicate the same type of results.

4.3 Resources in health care

The factors that affect the private sector competitive positions are usually those that should increase the effectiveness of various parts of the company. The means that increase the performance vary between organizations, and each organization has to find its own strengths and concentrate on them. Although the aim is to increase competitiveness, the first need is to analyze the organization's own and the environment's capabilities and resources. A similar process has to be performed in any industry, whether it is competitive or non-competitive. The final goal can then be different. The concept of market failure can explain the need for a resource-based approach in the non-competitive public sector too.

The market failure concept explains the situation where economic efficiency has not been achieved through the market mechanism. In the private sector the markets define the supply and demand, thus the resources can be adjusted between demand and supply considering the price level. In the public sector the budget defines the use of the resources and the services are not based on market

price. In this case the internal resources restrict the effectiveness of the organization.

Stiglizt (1986) has defined four indicators on which market failure can be based:

- incomplete competition
- characteristics of public commodity
- external effects
- incomplete markets
- incomplete information.

The health economics capture the reasons why market-based exchange fails in individual-based service demand. There are lots of uncertainness about the need of health services and the effects of services on the individual level. The consequences of the illness can be serious and affect the individual's economic situation. Therefore, he/she needs insurance in the case of illness. The parties in health services exchange - consumer and producer - do not have the same information on the services and its reasons and consequences (information asymmetry). The producer has better information, which it can use in, e.g., offering useless services. Part of the services (e.g. injections) benefit society more than the individual, thus the individual's willingness to pay is not enough to produce the service. When society maintains the insurance system there is a risk of "free riders" or moral hazard in health behavior (Brommels, Elonheimo & Kekomäki 2005).

In the USA, market failure problems were the reason the so-called managed competition model was created. The model is based on the idea that the customer has a spokesman called a "sponsor", which is a professional organization that makes the decisions about acquiring the services from the producer on his/her behalf. The model led to a purchaser-provider model (see Chapter 3.1.2), which used the idea of managed care (Brommels et al. 2005).

However, the experiences in Sweden (Brommels et al. 2005) proved that market steering did not fit the public sector since it was not possible to solve the valuing of services and the problem of information steering. Thus economic efficiency in public health care cannot yet be achieved through the market mechanism. Organizations have to find ways to seek and improve the existing resources within the budget limits. Thus the ideas of the resource-based approach seem to be appropriate in health care when considering the increase in the organization's effectiveness.

There are of course lots of resources that could improve effectiveness in health care. The definitions below are not trying to list all of them but remains on an overall level with some detailed specifications. The detailed resources are based on the findings from the cases. As such, the resources do not vary from other areas, but the content, use and emphasis is different.

In this section the categorization of health care resources and their connection to IS follows the article of (Suomi & Tähkäpää 2002), which is based on the cases in this thesis. The resources are:

- workforce
  - quality
  - size
- operational procedures
- know-how
- premises
- specialized equipment
- goodwill
- trust
- brand
- finance.

Care taking is basically human service work, so the workforce is a key production factor and resource for the industry. As with any resource, the workforce has the dimensions of quantity and quality. However, in health care the strict professional hierarchy makes this differentiation greatly needed. IS is expected to replace the work force in routine work and free the workforce for more effective tasks, increasing quality in the more demanding areas.

Operational procedures are integrated with the business processes and external interactions of the organization. Operational procedures are more important the more routinized the organizational activity is, and the larger the masses that go through the system. In primary health care the volume is usually high and the procedures should be effective. Information systems do not work without rigid business processes and well-thought-out operational procedures. Automation first requires structuration. In this respect, operational procedures will gain in importance as IS proceed.

The term "know-how" here refers to the hidden, implicit and tacit knowledge owned and controlled by the workers. Know-how is gained over a period of years through individual and organizational learning. Know-how might focus on the basic operations and core competencies in these health care cases, but it is also needed in supporting activities, such as market intelligence or financial management. Information systems can contain a lot of knowledge, and as they drive the process of turning implicit knowledge into explicit knowledge (Nonaka 1994), the relative value of personal-bound hidden knowledge is set to decrease.

Premises are needed everywhere an activity, whether clinical or supportive, like administration, occurs. Premises are probably the single biggest resource of health care organizations as measured in classical capital terms. IS should lead to increased speed of clinical operations, which means that hospital stays will

shorten. Capital investments may also increasingly turn to IS at the cost of mortar.

Specialized equipment is increasingly being developed in all health care branches in addition to clinical equipment. IS is one of those which can be used in several situations. In digital imaging for example, IS enables effective distribution and safe storing. The integration of specialized equipment and IS is one of the main issues in developing the health care infrastructure and is certainly going to increase effectiveness and quality of service.

"Goodwill" is the amount of general acceptance by the customers enjoyed by the industry and the actors in it. The Finnish health care sector, which, so far, is mainly operated by public actors, enjoys customer acceptance. Goodwill will gain in importance and the competition for public acceptance can be influenced in many ways. As the monopolies of the public sector vanish, public opinion gains in value. Information technology further drives this development because with modern IS the mechanism for formulating and communicating public acceptance gains in efficiency.

Trust is seen as a core resource in the modern information society (Landry 1998; Allen, Colligan & Finnie 1999; Urban, Sultan & Qualls 2000). The wider the service options, the more important the role trust plays. In the public health care type of, almost monopoly, services trust is advantageous but not a necessity. As the market weakens the boundaries of time and location, care-taking relationships are free to establish themselves between parties who may not yet even know each other. Trust is of increased value in such an environment. The trust towards IS in health has many dimensions. People entrust their lives to the staff who use and have to trust the system. Thus in the case of patient mistrust it is easily directed towards the staff. The patient seldom knows what the role of IS is in the care process, though this situation is expected to change (Beun 2003). However, in the Primus case the customer inquiry shows that there is high confidence that IS will increase the quality of care. Against general understanding, people would also like to use more IS in monitoring their health condition. Thus the trust in IS in health care use seems to be increasing.

Brands have a key function in the case of services. They help the users to identify the product or service they want, and they serve as proof of quality, both in technical and intangible aspects. The trend for trust is also true for branding. Among different offerings that may look the same – for example on the Internet - the customers can easily select the one with a strong brand name. IS enables better information accessibility and transferability, and can improve the brand. However, it should be integrated with other resources like digital imaging or connections to external actors. For example, when a patient can move from one service point to other without having to move papers yet the information is always ready for her, the time the patient has to wait for the service decreases.

Finally, finance is a key lubricant for the whole system. IS is known to be an area of high capital investment. The trend towards placing a price tag on data, information and knowledge is increasing the importance of solid finance.

As noticed, the resource-based approach emphasizes the return on capital and competitive advantage in its definitions. Even though public health care is striving for better profitability, the focus is more on effectiveness and how the existing resources can be utilized more effectively. The concepts of profitability and competitive advantage are not used in the industry as such and it might be useful to describe the goals in the resource-based approach in a more non-competitive way. However, even though the final goal is different in the public and private competitive environments, the means to achieve those goals does not differ that much. As Short et. al. (2002) say: "*the resource-based approach emphasizes that performance is function of obtaining and deploying unique assets"*. Managers of the organizations have to equip their organization with scarce resources that enable superior performance, and the choices the management makes should drive the resource accumulation process (Short et al. 2002).

Amit and Schoemaker's (1993) definition captures the idea of the resource-based approach very well. If the words "competitive advantage" are replaced with the words "superior service for customers", this definition is also suitable for the public administration. The customers should get superior service with minimal use of resources, which saves (taxpayers') money (Suomi & Kastu-Häikiö 1998). The words "sustainable competitive advantage" can be replaced with "sustainable effectiveness". Another appropriate description to replace competitive advantage can be superior quality. Thus when discussing competitive advantage in this chapter it can better be understood as superior service or superior quality in health care.

Suomi and Kastu-Häikiö (1998) defined the resource-based theory for public health care from the definition of Amit and Schoemaker (1993) in the following way: *"For managers the challenge is to identify, develop and deploy resources and capabilities in a way that profices the organization with a sustainable effectiveness and, thereby, a superior quality/service"*.

Andreu and Ciborra's (1996) definition can also be modified to better fit the health care environment. The change can be done even more easily than with Amit and Schoemaker's definition. "Source of competitive advantage" can be changed similarly to the previous definition as a source of "superior care".

"*Core capabilities develop in organizations through a fundamental transformation process by which standard resources, available in open markets, are used and combined, within the organizational context of each firm, with organizational routines to produce capabilities, which in turn can become core and the source of superior care.*

As discussed in Chapter 4.2 where the resource-based approach was defined, the fundamental means and goals in seeking the resources and using them effectively differ very little between the private and the public sector. But the eventual goal can be different. The similarities and differences are illustrated in the Figure 11. The higher in the pyramid the organization is climbing, the harder it is to gain and specify the resource.

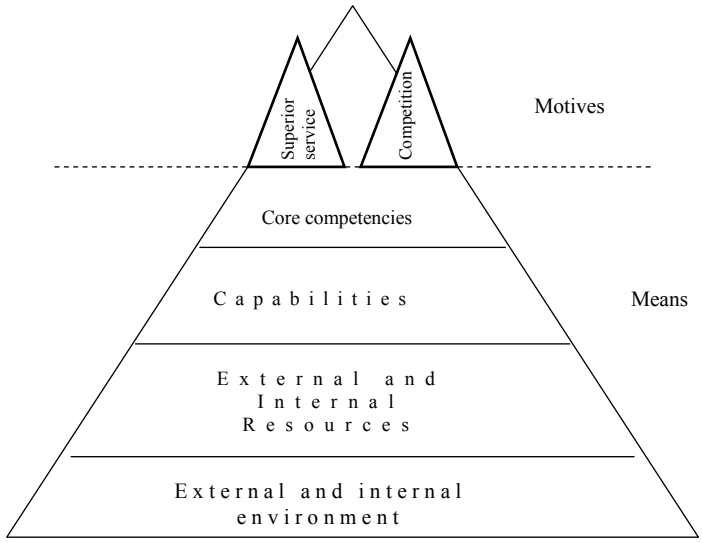

Figure 11 Focus of the resource-based view in the private and public sector.

Figure 11 relates to Barney's (1994) definition of the capability development process in private industries, but it does not include the learning aspect.

The focus of the private sector is similar to the level of core competencies. For private sector firms, it is important to find key resources and turn them into capabilities and core competencies, and, ultimately, to sustained competitive advantage. In this way they can improve their position in the market and create barriers against the companies who are accessing the area.

Public sector organizations are in a situation where resources are scarce and it is as important to find key resources from the external and internal environment and turn them into core competencies. However, the goal is not to create competitive advantage but more to find superior performance in order to offer superior service to the customer. It is seeking the most effective way to operate and those resources that are most essential in this effort. So, both are seeking the

core competencies but with different motives. One of the biggest differences in motives seems to be protection of one's own environment.

5 THE FRAMEWORK OF IS MANAGEMENT IN HEALTH CARE

The second, and the main, goal of this thesis is to find the kinds of issues that affect IS when it is developing as a core competence. The focus of the study is on the strategic management level of IS and thus the issues that affect the management decisions and understanding of IS.

There are several hindrances and obstacles at the management level that affect the adoption of IS and make the implementation and effective use of IS a complicated task. Four management areas are presented in this chapter, each of which include few features health care should emphasize. Those areas can be sources of obstacles, but, by understanding their content and connection to the basic services, and, especially, clarifying their role in public health care, they can become opportunities to improve the level of the services.

The development of IS to a mature level has been researched earlier. Those IS maturity models are discussed first. Even though they are from different areas and their scope is somewhat different, they offer a glance at how IS maturity has developed in other areas.

5.1 The models of IS maturity

In the resource-based approach there are different views on a number of resources that should be included in the resource analysis in an organization. Foss (1998, p, 143) emphasizes that several resources should be used where there are *"strong relations to complementarity and co-specialization among individual resources, so that it is not really the individual resources, but rather the way resources are clustered and how they interact…"*. Internally created resources are usually such that form a resource cluster and in which each individual resource is important in maintaining and creating such clusters (Foss 1998).

It is quite clear that IS resources in general and in health care are such that will not create any effectiveness or improved quality, or, in the case of competition, any competitive advantage, without clustering with other resources (Figure 12).

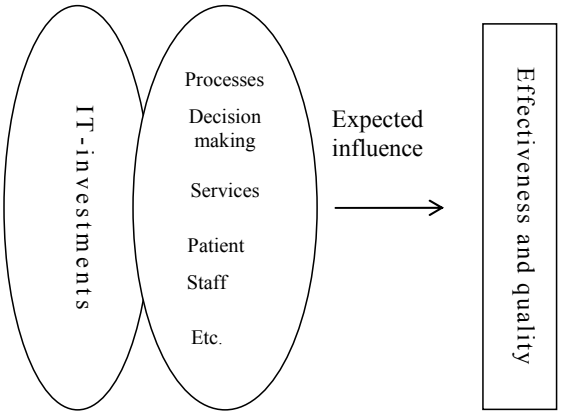

Figure 12 Clustering IT investments and other resources in health care.

The implementation and adoption of new phenomena in an organization usually follows an ascending and descending curve with certain phases before reaching the maturity of use. Perhaps the most famous model of IS maturity is Nolan's (1979) six stages of growth (Table 2). But before that, Gibson and Nolan[5] wrote a seminar article on the stages of growth in information technology. They claimed that costs in data processing followed a similar development and pattern in different companies, which was called an S-curve. The S-curve described the pattern of learning and implementation. There were four phases in their model: 1. decision to invest and project initiation, 2. technology learning and adaptation, 3. rationalization and management control, and 4. widespread technology transfer or technological diffusion. Nolan improved the model and expanded it to a more comprehensive six stage model (Chan & Swatman 2004).

[5] (Gibson & Nolan 1974).

Table 2 Nolan's Six Stages of Growth (Chan & Swatman 2004).

Stage	Description
Stage 1. Initation	Technologies are introduced into the organization for performing simple administrative functions such as automation, payroll or general ledger
Stage 2 Contagion	Computers are adopted in some areas. The learning curve moves up sharply and the use of technology expands. The organization becomes more convenient with the technology. Top management encourages line management to adopt technology. Data processing managers follow the industry trends
Stage 3. Control	Organization reacts to uncontrolled expenditures on computers. The deliveries of projects are late and there are unsatisfied needs. Users are frustrated.
Stage 4. Integration	Acceptance point. Users start to accept systems and realize their needs. There is a need for better control to provide more effective systems.
Stage 5. Data Administration	Data administration is introduced to enhance the control of the system
Stage 6. Maturity	Organization begins to trust systems.

The Gartner Group has introduced a model they call the technology hype cycle (Figure 13). The model is largely based on the press coverage and market behaviors of a certain technology and not much on the efficacy of technology (Broadbent & Kitzis 2005).

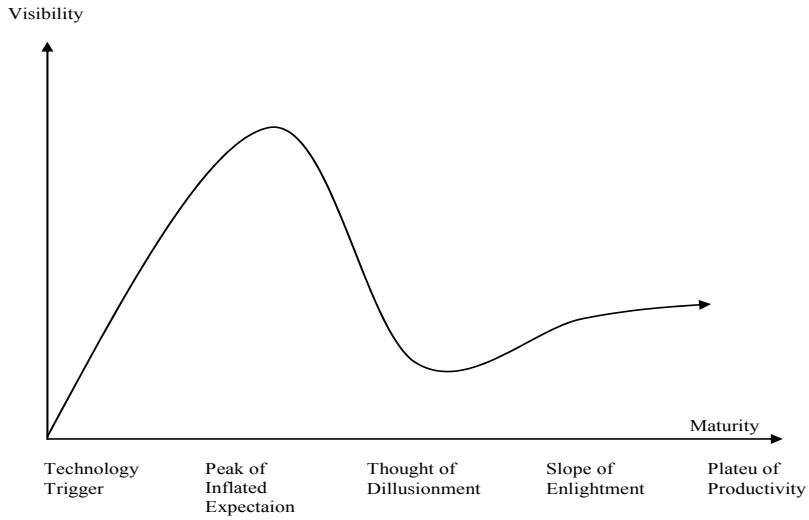

Figure 13 The Gartner hype cycle for emerging technology (Broadbent & Kitzis 2005).

The *Technology Trigger* is a breakthrough, product launch or some other event that is starting to interest the press and audience.

The *Peak of Inflated Expectations* is the stage of over-optimism and unrealistic expectations. However, some success might occur but they are more exceptions than rules.

In the next step new technology has to go through *Disillusionment* where all the expectations prove to be wrong and the technology soon loses interest amongst the press. The technology and the topic is soon forgotten.

Slope of Enlightenment is the stage only some will attain. Those organizations get to understand and experience the practical value of the technology.

The technology will attain the *Plateau of Productivity* when the benefits become widely demonstrated and accepted. The technology becomes stable and moves to the second or third generation. The height of the plateau depends on how applicable the technology is, or whether the benefits are only in a niche market.

The idea of the hype cycle is that following just the new and fashionable technology will probably go nowhere. However, the cycle will help in understanding value of new technology. It is not necessarily in the technology trigger phase but after the most fashionable and enthusiastic part is over. To find the real benefits sometimes requires patience and failures (Broadbent & Kitzis 2005).

Willis and Willis-Brown (2002) found a similar curve with system maturity in their research on ERP implementation. The model is based on the benefits of new technology. ERP is often compared with electronic patient record systems since both manage the information use, storing and distribution around the organization. Willis and Willis-Brown have basically divided the maturity in two stages (Figure 14). The first stage ends at the “go live” phase, after which the real benefits of the system occur. The hastiest of the implementers won’t get any further.

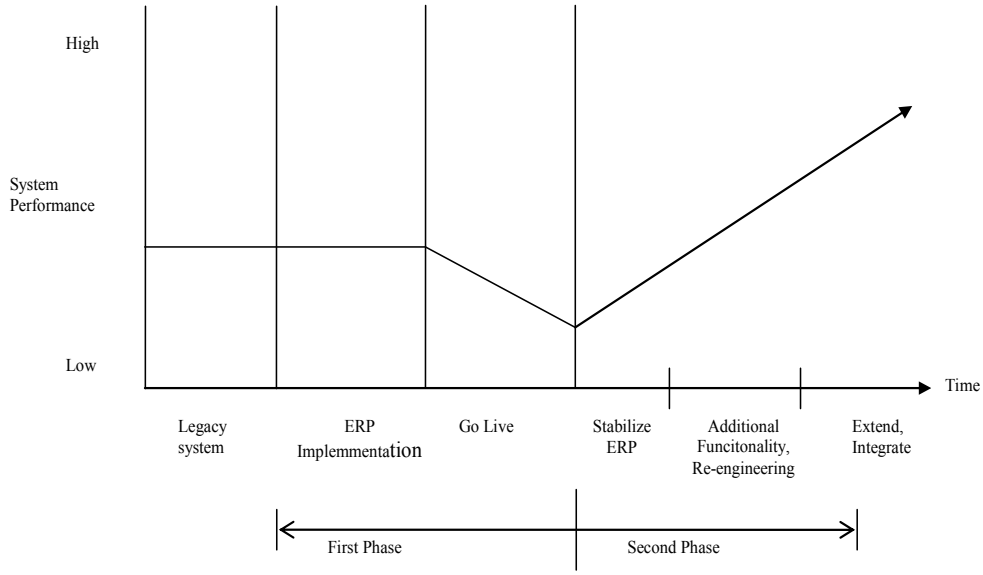

Figure 14 Performance trend for ERP implementation (Willis & Willis-Brown 2002).

The first phase of the model is moving from legacy systems to ERP. This means a great step from almost primitive systems to systems that need high expertise. The problem with this stage has been that organizations have trusted in-house expertise, which, in most cases, has been limited. This has resulted in improper setup and lots of problems. Therefore, hiring expertise has become a critical factor in the success of ERP. Further problems were caused when organizations tried to hire skilled people. It was difficult to find people with enough expertise to understand the core of the business and IT, and some of the system's features were left unused (Willis & Willis-Brown 2002).

The next feature of the "go live" step is that there will be a drop in performance. The process renewals are usually left aside and the new system does not support the old ones. In the stabilization stage the organization should assess the major problems and mistakes made in the "go live" stage that concern the core system. In the next step the functionality should be increased in such a way that the acquired but not used modules should be mobilized. In the last step the organization should extend its system in such a way that it can be integrated with existing systems. This means that although ERP systems are comprehensive, they usually have some weak modules which have to be acquired from elsewhere. The integration of these systems with the existing systems has to be executed carefully (Willis & Willis-Brown 2002).

There are also other well known models for stages of growth, like Earl's stages model (Earl 1989). These models concentrate on the path from the introduction of IS to maturity. The path and the problems are explained in different ways, but basically they include similar problems.

5.2 The structure of the framework

In Figure 15 the areas of management are presented with the ascending and descending curve. The Figure also shows the theoretical background used in this thesis to illustrate the ever-increasing problem of lack of resources. The four areas represent the critical points in IS implementation and initial use.

The areas in the Figure have been derived from the empirical findings of the cases in this thesis, and the maturity curves discussed in the previous chapter have been used as a background and a model for the shape of the framework. The framework follows the maturity of certain areas in health care IS development towards better effectiveness and quality. However, there is always a final step in the early maturity models where the system is considered mature. In the framework here, the final and absolute effectiveness and quality can't be said to have been achieved. It is more a framework that emphasizes areas that have to be considered on the management level if the effectiveness and quality is to be attained. After all, it is difficult to say what the absolute point in effectiveness and quality is, especially in health care.

There is a stage in Nolan's model where some parts of the organization are adopting IS (stage 2) and after that the costs begin to increase uncontrollably and development becomes slower (stage 3). This was a distinctive feature in the P-S case; after the installation and some experience of use, it emerged that the costs to develop the system would begin to explode unless there was a proper long-range plan for the development. In general, the adoption of IS in health care has followed Nolan's model.

The Gartner hype cycle demonstrates whole of the health care industry, which did not jump into the first IS hype. Deliberately or precipitately, it remained at the first hype, and only started to adopt the systems after private industries had gone through its most costly development steps. According to the Gartner hype, those who attain the *slope of enlightenment* step will experience the practical value of the technology. The cases in this study probably just went on the hype at the right stage. Although there were problems, they were focused more on management and organizational areas than the problems in the technology.

The third model also describes the development in the cases and health care in general. The first part of the model describes the change from the manual system to EPR. This usually causes some problems, although in both case organizations

in this thesis the implementation stage went without catastrophes. Both cases had different implementation strategies - P-S used an in-house solution while in the Primus project all the key technology areas were outsourced. However, after lessons in the "go live" stage, both organizations wanted to find the problems and future development plans of IS. After that, the steady development and use of the system could follow with an increase in performance.

The stages in the previous models also describe the development in health care IS. However, some distinctive features arose in the cases, which differ from the models. Furthermore, the focus of the framework here differs slightly from the previous models since the framework focuses on a shorter period of time in IS adoption; the framework concentrates more on certain areas in the implementation stage and at the management level. Thus it is hoped that the framework will offer a new and supplementary view on the maturity models.

The first area discusses understanding the areas of IS and health care in the IS implementation process. The IS professionals sometimes have difficulty understanding the nature of health care, which creates problems in co-operation and vice versa. Understanding the underlying meaning of each single professional word is not the most important thing, but understanding the wholeness in a communication is. Metaphors are often used in a situation where new ideas and systems are introduced. The conceptual models actors in the implementation process of IS carry towards the systems have a deep impact on their adoption.

The metaphors that are provided for health care professionals by information system professionals and, especially, vendors are often too simplistic. Health care professionals do not necessarily understand the social complexity of implementing extensive information systems. The metaphors for increasing understanding between health and IS professionals are discussed in Chapter 5.3 "Using metaphors in understanding and managing the nature of health care and IS". The area is discussed in more detail in the paper "Information System Metaphors in the Health Care Sector – from Harmonized Value Chain to Realistic Market Models" (Suomi et al. 2001).

The second area is the lack of strategic perspective in health care. There has been planning and even long-range planning in health care, but real strategic planning has not been effectively used in public health care organizations. There are several reasons for that and one is the lack of skills; medical or nursing education has not included managerial aspects. This area is discussed in Chapter 5.4.

The third area discusses the governance structures and processes in health care. Those are developed over decades or even centuries, and are difficult to change. This area is studied in Chapter 5.5 and the issue is more closely

discussed in "Governance Structures for IT in the Health Care Industry" (Suomi & Tähkäpää 2003).

The fourth area considers the investment priorities in health care. Priorities are related to different expectations of what and how the investments should impact on services. Those with high priorities are most probably also expected to solve more problems than those with low priorities. Of course, the legislation also affects the priorities. Expectations towards IS have often been on an unrealistic high level and the results have not been what different interest groups have expected. There are ways to affect the expectations of different interest groups so that they remain on a realistic level. This area is discussed in Chapter 5.6. The area is also studied in "ICT and resource-based approach in creating core competencies in public health care" (Tähkäpää 2004).

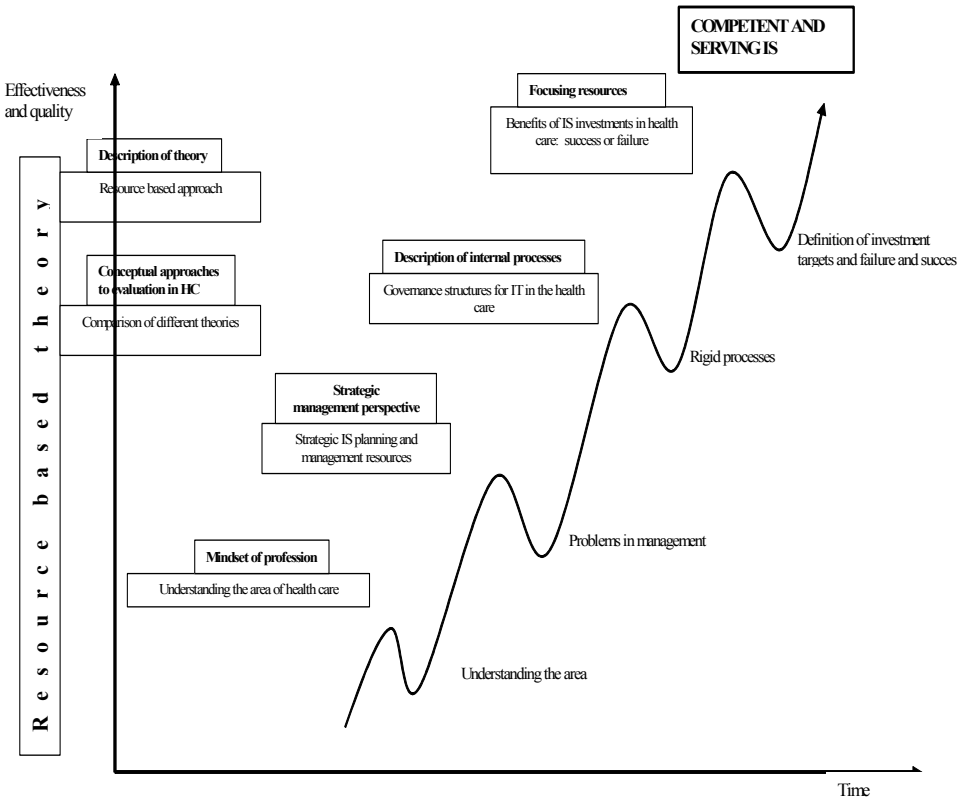

Figure 15 The framework for IS investments to develop effectiveness and service quality in health care.

5.3 Using metaphors in understanding and managing the nature of health care and IS

For several reasons, the health care sector might not have a similar tradition in the use of information systems as many other industries. First, the application of IS is a quite new phenomenon in health care. Second, the transformation has been very intensive and fast. Third, health care is dominated by strong professionals that have their core competencies in areas other than organization and information management, contrary to the situation in most established information system users in the commercial, not to mention the administrative field.

In any, but especially in this greenfield, situation the conceptual models actors in the implementation process of information systems carry towards the systems have a deep impact on their adoption. Health care professionals are perhaps served too simplistic models about organizational computing by information system professionals, and especially the firms implementing systems. Health care professionals do not understand the social complexity of implementing extensive information systems.

Organizational and information processing metaphors serve as a basis for the conceptual model actors build towards an information system (Kaarst-Brown & Robey 1999). In this section three types of organizational models observably used by health care professionals are briefly discussed. The first group is that of simple, or more positively put, harmonized models that seem to be used a lot but do not provide a complete picture of the complexity of the real word. This group includes the organizational metaphors of:

- value chain
- care-taking chain
- governance structure.

The second set of metaphors consists of those models that are considered more appropriate and established in the information system field, especially in discussions of modern telecommunication-based market forms. These metaphors focus more on the complexity of the organization's external interactions. This group includes the organizational metaphors of:

- B2B marketplaces
- syndication
- strategic alliance.

Finally, some older metaphors are "rehabilitated" in the third group, which are found especially appropriate for the health care field:

- superbrain.
- jazz band.

The metaphors are selected on a subjective basis from the earlier literature, and their ability to explain the complexity of the IS field. Each presents a different degree of complexity and can be used in different situations and for different groups. There are several other metaphors used in the IS literature, like war metaphors in a discussion of strategies (Mason 1991). However, in this research the attempt is to offer a few metaphors to better explain the challenges in IS projects.

However, there is no complete or authoritative list of possible metaphors. Metaphors are used in daily operative and cognitive interactions, and are unstable; some are trendier in some situations, some are quickly forgotten, some have most surely not even emerged yet.

This chapter is mainly dedicated to the discussion on these three types of metaphors. The main idea is explained for each metaphor. Further, its strengths and weaknesses are elaborated, and finally its applicability in the health care sector is assessed.

5.3.1 The role of and need for metaphors

The importance of metaphors is clearly expressed by (Shivastra & Barrett 1988): "The process of giving language to experience is more than just sense-making. Meaning also directs actions toward the object you have named because it promotes activity consistent with the related attribution it carries. To change the name of an object connotes changing your relationship to it because when we name something, we direct anticipations, expectations and evaluations toward it."

Mason (1991) states that metaphors perform a crucial role in enacting strategy and linking strategic thinking with IT planning. According to him, metaphors serve four important roles in that process:

- First, metaphors provide a way to encapsulate features of a situation or process and communicate these aspects to others without having to spell out all the details.
- Second, metaphors perform a significant role in providing a conceptual framework and vocabulary in new situations, settings in which there is little or no previous experience.
- Third, metaphors promote understanding by requiring active engagement in the communication process.
- Fourth, because of the same characteristics that enable us to comprehend one concept in terms of another, metaphors necessarily "highlight" some aspects and "hide" others.

Through these four roles, metaphors exert powerful influences on how problems are defined and solved. Metaphor has been shown to be important in

selecting and describing problem solutions, identifying solutions from which to choose, and stimulating creative thinking (Shivastra & Barrett 1988; Mason 1991).

Metaphors are particularly useful in economic analysis, which can be complicated and difficult to summarize. The distinctive features of economic analysis are (Folland, Goodman & Stano 1997):

- the assumption of rationality
- the use of abstraction
- the use of marginal analysis
- the use of models as metaphors.

Information systems and health are both very complex constructions and understanding them thoroughly demands a lot of expertise. Therefore, metaphors are useful in these two areas. In that way it is also possible to create a common language between IS and health care professionals.

5.3.2 Harmonized models

Value chain

Porter made the value chain concept popular (Porter 1985). Since then the concept has been widely used, but has also awoken a lot of criticism for its simplicity - see, for example, (Hendry 1990). The basic idea of the value chain is a one-directional flow of material and information in a production process. The value chain emphasizes the resources needed for production but does not mention information or information systems, at least not explicitly.

The strength of the value chain is its simplicity. It paved the way to the thinking that organizations should concentrate on the main value adding activities, later called core competencies. The weakness of the value chain lies in its one-direction flow of activities. The value chain is unable to explain complicated market-based interactions, not to mention modern virtual organizations.

Modern health care must happen in a network, where different parties provide their input to an end product, be it a healthy individual or the health of a population in general (see also the discussion later on the superbrain metaphor). This network is very unstable, often conflict-laden and most surely less than optimal in performance. It is far away from the “value chain” of the business literature, and even further away from the like “seamless care-taking chain” proposed in health care language. The chain metaphor is one-dimensional and flows in one direction, whereas in practice the activities take place in many directions and in a networked mode.

Care-taking chain

In the care-taking chain model the main focus is on the customer; various health care providers form a chain in which the customer is moving, depending on the treatment needed. In Finnish health care the most discussed chain is between social services, primary municipal health care and special health care. Patients don't have to take care of difficult bureaucratic activities, they receive all the necessary treatments without needless and sometimes even double examinations or explanations. Information on the patient is in real time in every organization.

It is questionable whether the idea adopted from the value chain model where the focus is on the industry product is adaptable to the environment where the human is in the central role. In the case of human, the chain, routines and product thinking might sound somewhat cold and inappropriate. One can't help thinking of a human on a conveyor belt, where you don't have to do anything, say anything and interact with anything or anyone.

There is also a question of responsibility. The chain should only be seamless for the patient. Under the invisible chain there are several organizations interacting in a complicated system where the responsibilities should be clear. If the node is too loose, conflicts in responsibilities might emerge between organizations. Therefore, the organizations should maintain clear lines between each other.

The idea of a care-taking chain should not be abandoned however. For elderly people, the idea that all the patients' information concerning health is taken care by an invisible chain might be good news. The question is, how much the patients want to interact with the organizations and the health care staff. The need to control and possess your own information is usually strong and the invisible chain idea can reduce it. The model also sounds slightly passive. The idea in modern thinking is to motivate people to participate in the society's activities more and to allow patients to participate more in their own care. Providing a possibility for the patient to control and check the information might help the model fit the health care sector better.

Governance structure

A typical way to look at an organization is to see it as a governance structure. The basic alternatives for governance are market and hierarchy. In sourcing decision terms we speak of in- and outsourcing.

Researchers have suggested several reasons why firms outsource their IS. These key drivers include financial reasons, such as reducing costs, generating cash and replacing capital outlays with periodic payments. Firms also outsource IS to simplify the management agenda and focus on their core competencies. Technical reasons for outsourcing, such as improving the quality of IS, gaining access to new talent and technology, and the easy availability of vendors with

expertise and economies of scale, have also been proposed. “Political” reasons for outsourcing include dissatisfaction with the IS department and the chief information officer, viewing IS as a support function, pressure from vendors, and a desire to follow a trend that has received wide coverage in the popular press (Smith et al. 1998).

The conventional guideline is that all new and strategically important tasks should be performed internally. According to (Reponen 1993d), organizations should consider a combination of different alternatives along the spectrum of total outsourcing or insourcing. Organizational decisions should be made consciously and they should be based on the company’s IS strategy.

Information and knowledge is considered one of the most important resources in health care and that makes management of information an important issue. Information on the patients and their drugs, treatments, illnesses, condition, etc., is used in most of the situations when staff and patient meet. Thus the importance of information is concretized in the form that the patient is treated. With bad information, the treatment can be wrong and cause different implications. The management of that information is complicated since the information has to be unambiguous, updated and easily available. Further, the information should follow the patient, even when she/he changes the organization - e.g. from public to private, or even between public sectors. Thus the flow of information in health care is a critical area to develop. Van Ginneken (2002) discusses the potential benefits of computerized patient records and the areas she emphasizes are all involved with access to information.

Health care organizations have started to adopt information systems quite recently and have not yet accumulated expertise and traditions to manage them. The lack of expertise has resulted in information systems developing as difficult, complex (Khoumbati, Themistocleous & Irani 2006) and expensive entities to control. Therefore, the trend is towards outsourcing.

5.3.3 Market-oriented models

B2B marketplaces

At the broadest level there are two ways in which a company can buy services or products. It can either use systematic sourcing or spot sourcing. In systematic sourcing it can use negotiated contracts with qualified suppliers. In spot sourcing it often uses different suppliers to fulfill the immediate need at the lowest possible cost (Kaplan & Sawhney 2000). Both can be used in business-to-business (B2B) marketplaces where the purpose is to offer an effective channel for customers and suppliers to trade.

A new and effective marketplace to do B2B is offered by the Internet. There are several reasons why companies have started to use the Internet as a business place: huge number of buyers and sellers together, automated and cost-effective transactions, giving sellers access to new customers, pioneering possibilities, fewer credit losses, and also "because our competitors are doing this" (Kaplan & Sawhney 2000; Puhakainen & Malinen 2000). From the information system point of view, the Internet has facilitated the use of several applications: supplier management, inventory management, distribution management, channel management and payment management. Those applications can be used to do orders, check stocks, choose appropriate distribution channels, check terms of payment, etc., to rationalize orders (Kalakota & Whinston 1997).

The strength of B2B marketplaces is the effectiveness. Supplier can meet provider and vice versa in a place agreed beforehand and the arduous and expensive search for best partner can be forgotten. Another strength is trust (if the marketplace is reliable) when the partners in the marketplace are known. The weaknesses of using B2B marketplaces can be commitment to one or a few partners when the price, service or other functions of other possible partners can be missed.

The health care sector is quite rigid when considering product or service supply. When the organization is supplied from outside, there is usually a public competitive bidding for suppliers. Usually one or a few suppliers are chosen and the prices are fixed after the process. It can be considered systematic sourcing but the problems are that the contracts usually last several years and are not negotiable. In B2B the idea is that the suppliers and the vendor can effectively compare the partners and easily change them.

Inside the organization, however, the supply of services is more straightforward. The services are acquired from a certain vendor (unit) and the prices, quality and trust are expected, which all are included in the B2B marketplace idea. The lack of a B2B model in completely insourced health care services is that there are no alternative service providers. In the case of mixed sourcing options, where there are both external and internal providers, the B2B model is in a more appropriate environment. Then the selection of providers is also included. The use of the B2B marketplace model could clarify the organizational structures in health care - e.g. that who is doing "business" with whom and whether there are any alternative places to gain those services.

Syndication

Syndication involves the sale of the same goods to many customers, who then integrate them with other offerings and redistribute them. In the traditional business world with the fixed physical assets and slow moving information of the industrial economy, the syndication has been rare. The increased use of

information systems has made syndication possible. Information systems offer the fluid and flexible networks syndication requires in order to operate. The features of syndication are that it only works only information goods, it needs modularity and it requires many independent distribution points (Werbach 2000).

There are usually several health stations in the health care organizations. Those all offer mainly the same products or services to their clients. In addition, they are all are independent and several service products can and have to be put together inside the units to achieve the required service. The service provided from the stations is usually information, which covers all the features that determine syndication.

The information between health care units is more often transferred via data networks. The use of the Internet is increasing and health care products form an ideal entity to use syndication as a metaphor for effective distribution. Although it is not possible to offer all of the products through networks, such as operations, the knowledge used to perform them can be acquired through syndication. The patient record systems offer information via the network to all members of the health care staff (authorized) who need it to perform good treatment.

Strategic alliance

Strategic alliances are one way to expand or secure one's own activities or markets. The definition of strategic alliances varies a lot, but in the widest definition it includes forms like joint venture, marketing and distribution, franchising, R&D, licensing, consorting and subcontracting. As the word "strategic" points out, all the partners in co-operation should benefit from it in the long term and, if possible, the scale of benefits should be equal. For strategic alliances, it is also characteristic that those are carried out with competitors and that the companies involved can be different in size (Faulkner & Johnsson 1992; Lorange & Roos 1992; Goold, Campbell & Alexander 1994).

Motives for forming strategic alliances are several. They can be external motives like ever changes in R&D environment, benefits of scale, increasing instability, government's activities and increasing competition and internationalization. Internal motives can be lack of resources, reducing risks, transaction costs, speed of products life cycle and learning. (Lorange & Roos 1992). It is obvious that the motives differ from companies depending e.g. size and products but there are several motives that can be identified in all companies.

The health care sector differs a lot from a traditional company that faces competition. Health care doesn't face the problems of multinational or high-tech companies that struggle to survive. One important distinction is in shareholder thinking when the owners of a private company are expecting profits; the shareholder in health care is expecting better service (customer) and effectiveness

(government). The owners of both sectors have their expectations of the business, although the outcome is different.

The strategic alliance as a metaphor is adapting well in the health care area. While the demand for services is increasing (Saltman & Figueras 1997), the supply lacks resources. Other internal factors like high transaction costs, increased volume of new treatments (product cycle), new technology (clinical) and need for constant learning, as well as external factors like government demands (requirements for the municipalities), R&D and benefits of scale, are making the use of strategic alliance suitable for the area.

Externally, the basic chain of health care most often includes at least social services, basic health care and special health care, which work in co-operation. However, the effectiveness of this chain is not the best possible and there are several overlaps. Competition is not a reason for the overlap but the lack of co-operation and the lack of knowledge of a partner's functions are. One of the basic ideas of the strategic alliance is that the individual and internal goals of the partners don't have to be convergent but they do have to co-operate to achieve those goals (Shaugnessy 1995). In health care the common goal is, of course, a healthy citizen but each partner has specific resources to realize that goal. With alliance, both goals are achievable.

5.3.4 "Rehabilitated" models

Superbrain

The superbrain metaphor was used in the 1960s and 1970s as a metaphor for regional policy. Proponents of the metaphor wanted to support the development of big cities at the cost of rural areas. The idea is that by concentrating activities on the large unit it is possible to achieve accumulation of knowledge, innovation processes and social networks.

Current research stresses that in order to build up a superbrain not all activities must be collected into a single physical place. Virtual organizations can take the place of a superbrain. A good example is the "open source software movement", where a group of free individuals jointly contribute to a common goal.

Joint work for a common goal is usual in health care too. The health of an individual is a joint effort by many different professionals who must all work towards the same goal. One doctor must coordinate the activities, but very many different skills are needed, and there must be tools and techniques to bring these skills together. Why not then mirror this kind of activity in the metaphors of health care too?

According to (Markus, Manville & Agres 2000), the open source software movement and other virtual organizations have the following glue elements that keep the work concentrated:

- Managed membership
- Rules and institutions
- Monitoring and sanctions
- Reputation.

These elements are very visible in the health care industry. The profession is highly regulated (managed membership) and covered with a multitude of rules and institutions. Reputation is a key motivating factor for health care professionals, especially in the category of top performers. Just the monitoring and sanctions toolkit is yet underdeveloped from our point of view.

Very practical superbrain developments can also be seen in health care. Hospitals are physically growing bigger and bigger and concentrating on a few units. The trend is the same in the virtual organization. Huge Internet-based portals and hospitals provide access to a multitude of data, information, knowledge and personal consultation when needed.

Jazz band

The production of music differs a lot from one music type to another. A symphony orchestra is lead by a single orchestra conductor and the orchestra plays in the way he/she thinks is best. There is not usually space for an individualist. The violins can't start improvising without the conductor letting them do so. A less management-oriented music type can be pop music, where the song is always played according to the same notes but there is a possibility to improvise during the solo parts. Maybe the most improvised music type is jazz music, where the band members have a lot of freedom. In the jazz type called jazz-fusio, all the musicians seem to play a different song, but the result is achieved. The band acts as a highly trained self-steering organization, where all the professionals know what to do to achieve the required goal. No one has to manage them during the session. However, there can be a manager during the rehearsal period, who gives the guidelines on how and what to play (Hatch 1998; Lewin 1998; Zack 2000).

The health care environment can act like a jazz band in the best situation. There are only educated professionals working in the organization, who all know their job. The organization doesn't need a daily management to do their duties, but in the long run somebody has to draw the guidelines – strategy – and what the eventual goal is. The organization is like a jazz band, self-steering. The model also stresses the character of health care when professionals need to have freedom to make their own decisions. In an emergency situation there is usually no time to discuss the working or strategic effect of the operation.

5.3.5 Summary

The metaphors used are summarized in Table 3.

Table 3 A summary of the discussed metaphors.

Metaphor name	**Main message**	**Strengths**	**Shortcomings**	**Contribution to the health care field**
Value chain	Streamline flow of material and information in a production process	Simplicity Concentrates on core competencies	One-dimensional flow of material and information Information processing capabilities have no role	Health care happens in a complicated network – value chain too simplistic
Care-taking chain	Customers as objects in a flow of operations	Customer orientation	Little emphasis on responsibilities over and owners of actions	Understanding health care as a value chain is one possible metaphor
Governance structure	Search for each activity the most effective and efficient resource	Suits the modern network organization well	With outsourcing, own control and learning experience might be lost	In health care, where expertise is fragmented and scarce, outsourcing activities is a natural tendency
B2B marketplace	Professional organizations are meeting in a regular place to do business	Effective Focused Reliable (needs authorization/ recommendations)	Inability to see other options	Internally can give value and clarity to the organization
Syndicate	Way to integrate different information services into one complete product	Fits for area where information is fragmented	Several limitations on use Information products only	Ideal for health care where several (often) independent services form one product
Strategic alliance	Through co-operation partners can achieve equal and separate goals	Co-operation gives strength to otherwise weak areas	Opportunism Lack of balance of partners (size, outputs, interest, etc.)	Between different external and internal interest group network clarifies the goals of the groups
Superbrain	Accumulation of knowledge and innovation; big challenges need joint efforts	Places knowledge and innovation in a central place. In line with practical developments in health care field	Not supporting current trends of decentralization	There is a need to take a closer look at the mechanism that make a superbrain born and work
Jazz band	A self-steering organization	Stresses the professional skills Possibility to improvising	Not good for organizing purposes	Management of highly skilled professionals must be flexible

The analysis shows that the currently used metaphors are inadequate in describing the organizational complexity of health care. So might the new ones be too, but adding more components to the metaphor portfolio will surely help the situation.

What then could be done in order to get the more complex and realistic metaphors into wider use in the health care field? The following actions are proposed:

- Health care organizations often work with modest resources, especially when it comes to senior managers in the health care sector. That is why they are left to the mercy of vendors and solution suppliers, who of course want to give a positive and fluent picture of the use of their products. Our advice is to involve more experienced information system professionals in the field.
- Failing projects often teach more than successful ones. Discussion about them should emerge. Even more forums for practical and academic discussion in the field should be established.
- Simply let time run. The field is in the enthusiastic contagion phase (Nolan 1973), more recently (Damsgaard & Scheepers 2000), where problems are not thought of and most of them have simply not emerged yet.
- Put the gravity point of activity on humans. Information systems do not run without dedicated users. In project plans, education and tutoring the use of systems should be given more emphasis at the cost of the technical infrastructure.

Metaphors of organization clearly guide our thinking and actions. Surely there is no single and right metaphor. The bigger the spectrum of different organizational models available and the more meaningful it is for an organization, the richer the understanding of the organizational reality. A richer understanding of the organization makes it possible find richer alternative solutions to problems, and fosters innovation, which is badly needed in the health care sector with its accumulating pressures.

In general, it seems that the current trendy metaphors in health care, such as the care-taking chain and outsourcing, are copied from the manufacturing industry and date a few years back. The more modern metaphors used in the Internet economy, such as syndicates and strategic alliance, have not yet found their way into the health care sector. In this aspect too, the flow of innovations should be faster. In a modern human information economy, health care should be the place where metaphors are born, not a place where they are copied without any criticism and discussion.

5.4 Focusing IS investment strategically

5.4.1 The background to the strategic IS planning

The strategic planning of information systems means the process in which the organization identifies and chooses IS projects that support the realization of its business plans and the attainment of the goals the organization has set (Lederer & Gardiner 1992). Further, the planning should ensure the commitment of the organization and sufficient resources to execute those projects (McLean & Soden 1977; Earl 1993; Segars & Grover 1998). In the public health care sector IS projects have to be rationalized well in order to gain acceptance for the investment and to get the different levels of organization and stakeholders to commit to the system. This chapter discusses the process of defining and reasoning the goals of IS projects. The emphasis in the chapter is on strategic IS planning and the viewpoint is the managerial level, which follows the general emphasis of this work. However, in IS planning, in addition to getting the top management level commitment to the planning and its execution, it is necessary to build a partnership with the information systems and its users, and assess the resource and skill requirements in the organization (Salmela & Spil 2002).

At the beginning of the 1980s organizations started to pay attention to the effectiveness and productivity of IS planning and systems, and concepts like the productivity paradox (Strassmann 1985; Brynjolfsson 1993; Jurison 1996; Brynjolfsson & Hitt 1998) were created. The trigger for the increased planning was the fact that IS investment started to grow quickly and often without control. There were also the first signals about the competitive nature of IS.

IS planning increased and changed its nature from operational and technical planning to include a strategic perspective with links to key business objectives. Strategic planning also became more broadly focused over the years, with a variety of adaptive approaches that emphasize industry structure analysis and environmental dynamics (Hufnagel 1987).

While the integration of IS planning and strategic planning was increasing, attention was also being paid to the planning methods and their effects on organizations. Organizations wanted to evaluate the success of planning, especially after there several problems emerged in the planning processes. The planning processes were large, with extensive mapping and prioritization of organizations' key projects and plans (King 1978; Lederer & Gardiner 1992). These mappings proved to be problematic for various reasons: it was difficult to get the users involved, single processes were not supporting the management's learning, and plans were too often left unrealized (Lederer & Sethi 1988).

Premkumar and King (1994) conducted research on planning practices in organizations. Their results show that information inputs and planning resources are significantly related to the quality of the IS planning process. The quality of the integration mechanisms also moderates the relationship between the information input and the quality of the planning process. The quality of the planning process and the quality of the implementation mechanisms is significantly associated with performance.

Several researchers emphasize that a planning process should be based on constant interaction between the users and the IS management. Excessive formality should be avoided, so that the research can also be based on empirical knowledge and consideration (Sambamurthy, Zmud & Byrd 1994). Planning should lead to a shared view of the goals of information technology use (Ruohonen 1991; Reponen 1994).

It was also found that no single correct planning method exists, and the methods should be established according to the organization's environment and the goals of the planning process. Examples of these variables are management culture (Pyburn 1983; Cash, McFarlan, McKenney & Applegate 1992), time span of planning (Ein-Dor & Segev 1978), the significance of the planned systems (Raghunathan & Raghunathan 1990) and the complexity of the systems (Pyburn 1983).

The cyclic nature of strategic planning was also emphasized. A crucial part after the IS planning, managing and implementation stages should always be the evaluation stage (Kumar 1990; Niemi 1993; Jalava & Virtanen 1998). In this stage the results are discussed again and the work processes are evaluated. Through evaluation an organization can improve its development methods and ensure that the users' goals have been achieved (Kumar 1990). Salmela and Spil have created a planning method in which they combine the strengths of both comprehensive and incremental planning methods so that emerging trends can be recognized and an e-business strategy can be formulated (Salmela & Spil 2002).

5.4.2 Process of IS planning project

There are numerous models and approaches on how to plan an IS project and different levels from which those plans can be approached. The strategic IS planning has a broad focus, whereas IS implementation or IS education planning present lower level planning. Further, the broad focus of IS strategic planning affects the longer timeframe and a higher level of abstraction or plans (Segars, Grover & Teng 1998). There are two different approaches to studying the strategic decision-making processes. The first emphasizes the number of phases that follow each other in the decision-making process and describes the decision

making as a process of what follows what. The second approach focuses on the key attributes of the overall decision-making process (Sabherwal & King 1995).

Next, two approaches are discussed to get a perspective on the process and the content in which the strategic IS planning could be done.

According to Segars et.al.'s (1998) study on the planning system dimensions and the internal co-alignment for design dimension, the planning dimensions can be divided into six process dimensions:

- comprehensiveness
- formalization
- focus
- flow
- participation
- consistency.

The *comprehensiveness* of the process basically means the extent to which the organization attempts to be exhaustive or inclusive in making and integrating strategic decisions in the solutions search in strategic IS planning efforts (C.f. Sambamurthy et al. 1994; c.f. Lederer & Sethi 1996; Segars et al. 1998). *Formalization* again means those structures, techniques, written procedures and policies the organization has to follow. The formalization should make the planning system more concrete and visible to different stakeholders. However, there is a fear that the formalized processes might also restrain the elimination of strategic issues when they become useless (Segars et al. 1998). Too much formalization should also avoid letting the decision making lean towards empirical information and consideration (Sambamurthy et al. 1994).

The *Focus* dimension emphasizes the vertical orientation of the planning and includes two kinds of orientation where the first emphasizes creativity and the second control. The strategic management and IS studies (c.f. Lederer & Sethi 1988) distinguish the dimensions so that an innovative orientation generates creativity in organizations whereas an integrative orientation focuses more on control. The *Flow* dimension means the division and devolution of responsibilities in the IS planning process between the different levels of the organization. The participation can be either "top down", where the number of top management is high and the number of lower level management is low, or "bottom up", where the planning includes a high number of function management in the initiation stage (Segars et al. 1998).

The *Participation* dimension emphasizes the breadth of involvement in strategic planning. The alternative in participation here can be either a narrow participation profile or a broad profile. In the first one the participation of functional and operational managers is low. The reason for this can be the limited knowledge of strategic views. The latter includes several participants from different operational or functional areas (Segars et al. 1998). This in turn

could be done to avoid the "bounded rationality" of top managers, which could be caused by the complex and dynamic nature of the competitive environment (Sabherwal & King 1995). The frequency of planning activities and the timescale and frequency of evaluation and revision of strategic choices are the focus in the *consistency* dimension. The environment in which the organization is operating defines the consistency of planning. The more turbulent and uncertain the environment, the more frequently the planning should be evaluated (Segars et al. 1998).

The definition above emphasized the dimensions the management should take into account in strategic IS planning. As a result, Segars et. al. suggest that higher rationality (high comprehensiveness, high formalization, control focus, top-down flow) and higher adaptation (high participation, high consistency) have positive effects on the planning activities. While the aim of the research by Segars et.al. is mainly to describe the process perspective of strategic IS planning through theoretical and operational development of the process dimensions and their structure, concrete methods are also developed for the IS planning.

Salmela and Spil (2002) have described strategic IS planning as a cycle with four distinctive parts. They claim that IS planning methods have been too static for the new age where new technologies like the Internet have emerged. The modern time needs methods that integrate the traditional and formal comprehensive method and more informal incremental methods. Compared with comprehensive planning, the main differences are in the process, but some typical informal outputs are also added, like mind mapping. Their four-cycle method includes the steps of:

1. Agreeing on planning objectives and stakeholders
    a) Evaluation of previous planning results and approach
    b) Setting planning scope and objectives
    c) Selecting participants and planning approach.
2. Alignment of business objectives and information objectives
    d) Reviewing existing documents and information resources
    e) Conducting business and technology analyses
    f) Aligning IS plans with business objectives.
3. Analyzing IS resources and technology infrastructure
    g) Planning the IS/IT infrastructure
    h) Planning IS organization
    i) Evaluating the IS/IT development portfolio.
4. Authorizing the actions
    j) Identifying organizational implications
    k) Defining criteria for decision making
    l) Authorizing final decisions.

The idea of the method is that a chosen period of time is divided into these four planning cycles and the four basic cycles are repeated in each period. In addition, each cycle includes three planning tasks (a-l), which again include activities (in total 45 activities) that suggest certain concrete tasks the management can carry out. Of the 45 activities under planning tasks, the manager can choose either some to be carried out in a certain period or they can carry out all 45 tasks. The activities can be, e.g., "list of current and planned projects", "scope of the IS planning process" or "communication plan". The objective of the four-cycle planning method is to offer management continuous planning process methods that offer both flexibility in choosing an appropriate planning process and the formalism for the organizations who prefer to have it in their planning processes, at least to some degree (Salmela & Spil 2002).

5.4.3 The model for the management of IS in health care

This section presents a framework of the management cycle of IS in the public health care environment. If studying the cycle steps in Figure 16 alone, it is probably suitable for any industry struggling with its strategic IS development. However, health care is in a reasonably early stage in combining strategic planning and IS. The public sector health care in particular includes numerous different features that differ from any other private or public industry with its wide area of services. Therefore, the steps in the cycle should be studied from the different points of view, concentrating on those special features and environments that affect the planning and management of IS in public health care. The model follows the phase approach mentioned earlier, in which the defined phases follow each other (c.f. Sabherwal & King 1995).

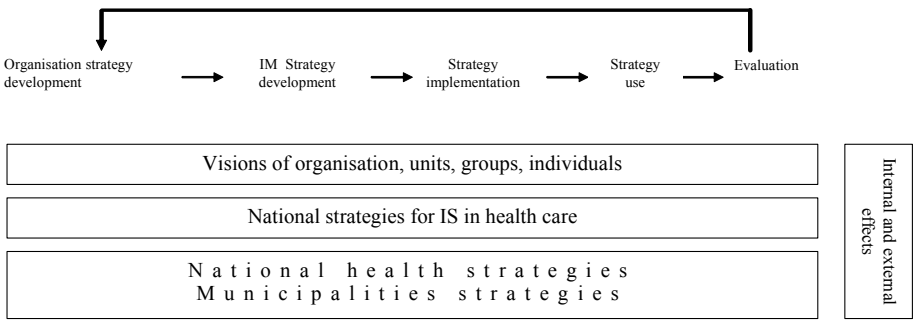

Figure 16 General IS management steps and the external and internal effects.

The first step is to create an organization strategy. Without a clear vision of the organization's future it is difficult to create information systems to support, or even to be a part of, that strategy. In business organizations this was already understood a few decades ago (Kriebel 1968; McFarlan 1971; King 1978; Earl 1989). The planning in public health care has tended to follow the so-called administrative planning method, where the division of resources and projects is decided annually based on the propositions from different units (Earl 1993). (Saranummi 1995) has also pointed out that the systems that have been developed so far only serve the present workings without considering the changes in health care. Schwartz and Cohn point out that traditionally non-profit organizations have concentrated their strategic planning on how to create value for their customers by emphasizing what products to offer. Most of the hospitals have some kind of long-range planning, but those plans are usually used to track and control programs and strategies that are static and mostly satisfy regulatory requirements (Schwartz & Cohn 2002).

Some reasons for this may be the status of the public sector and one-year budget plans. Public health care has been a self-evident institution and its economic system is highly dependent on taxes and State subsidies, which are granted yearly. There has been no need for deeper discussion about strategy, economic effectiveness or long-range planning, which clearly belongs to the private sector and to the competitive environment.

The information management strategy is the next step. The strategy should follow the guidelines of the organization's strategy. Moreover, the organization's strategy should consider the opportunities of information technology and formulate its goals based on it. This suggests that both strategies should be created more or less at the same time. Despite emphasizing the importance of integrating organizational strategy and information technology strategy, and the gap between, sometimes there is a gap, even in private business organizations. That gap is explained by cultural differences (Ward & Peppard 1996) and in health care this difference is emphasized since IS has played a very minor role so far. IS is only seen as a supporting activity serving mainly administrative units - a familiar view of the business sector some 15-20 years ago.

The next and maybe the most demanding stage is to implement the strategies to the organization. The implementation does not mean instant action but is more aimed at giving a general view of the development showing where the organization should and could be strong and able to create strategic projects. The strategy should show if a project is in line with other projects when creating an organization as a consistent unit. The implementation of a strategy can be seen as a long process and usually lasts at least 1-2 years. However the strategies should be internalized within the organization in order for them to be effectively used in the task of steering the organization's development.

The development and implementation of IS strategy is often done after implementing the information systems. Although, this is the wrong order, it is also natural since, usually, after the systems have been in use for some time and the first updates and extensions of the systems are done, the organization also faces its first problems. Without a clear understanding of what to acquire and for what purpose, and when issues like compatibility have not been considered, the system is fast developing as a rambling entity (Khoumbati et al. 2006).

Once the strategies and systems have been implemented the next step is to manage the use of systems. In this connection use means how the information systems create benefits for the organization. The use of information systems is heavily dependent on the success of the organization and information management strategies, and how they are internalized in the organization. The managers' and users' understanding of the effects and importance of systems for the organization are in a key position in managing the use. The management of use is often ignored because the process of creating strategies and handling negotiations, together with the acquisition and implementation of systems, have been a huge and stressful project, and once all this is accomplished, with at least moderate satisfaction, the project team breaks up with relief. The system is expected to work and develop by itself. Another general reason is probably simply the lack of expertise.

The last function of the cycle is the evaluation of the process of strategies, implementation and use. As with the management of use, this step is also very often skipped due to a lack of resources and expertise, but not because of lack on interest. Evaluation is a very complicated and demanding task and needs clear methods, of which health care organizations seldom have experience. However, another round of the cycle should start after the evaluation step and without a proper evaluation process that round is going to repeat at least some of the mistakes from the preceding round. The evaluation is often connected to organizational learning. Argyris and Schön (1978) explain that organizational learning takes place in dynamic single and dynamic double loop learning. Single loop learning only changes the way an organization is acting and double loop learning the underlying assumptions in an organization. Without evaluation, learning is most likely going to remain at a single loop level.

The external and internal effects come from the stakeholder groups and organizations around. This is probably the biggest difference between public sector organizations and private companies. Even though private companies have to consider the competitive environment and legislation, the steering effect of the environment is bigger or at least more dominating.

In a way, the markets also steer public health care. In its strategies it has to prepare for changes in the morbidity of the population, changes in funding, changes in social structures, changes in the availability of staff, changes in

technological development, etc. Each of the change affects the strategic planning and thus the IS planning. Those changes are sometimes more difficult to identify and predict than changes in the competitive environment, and they are certainly more difficult to detect.

5.4.4 Summary of the management and planning of IS as a resource

This section presents a framework of information systems management in public health care. Its aim is to illustrate the crucial functions and problems that affect the management and planning of IS in public health care. Those functions are presented in the framework as sequential steps. There are several features of the public health care environment that make it considerably different from other public and private industries. The changes in the external environment are probably the biggest difference between these two sectors. Separating the development of IS into sequential steps should ease the definition of those differences. Each step has gained lots of attention in private industry IS development and management. There are, however, several differences between the public and private sector activities and environments that have to be identified before an appropriate planning method can be implemented in health care.

5.5 Governance structures for IS

5.5.1 The role of government structures in organizations

The hypothesis is that modern IS has made the concept and operation of the governance structures even more important than before. IS supports some governance structures in health care better than others, and IS itself needs governing. The key issue of this chapter is: which kind of governance structures in health care are supported and needed by modern IS? The basic hypothesis is that information is a key resource for health care and that the managing of it is a core competence for the industry (Suomi 2001).

The pressures on the health care industry are well known and very similar in all developed countries: changing population, shortage of resources when it comes to both staff and financial resources from taxpayers, higher sensitivity of the population to health issues, new and emerging diseases, just to name a few. Underdeveloped countries dwell on different problems, but have the advantage of

being able to learn from the lessons and actions the developed countries made maybe decades ago. On the other hand, many solutions exist, but they all make the environment even more difficult to manage: possibilities of networking, booming medical and health-related research and knowledge produced by it, alternative care-taking solutions, new and expensive treatments and medicines, promises of the biotechnology… you name it (Suomi 2000).

From the public authorities' point of view the solution might be easy: outsource as much as you can out of this mess. Usually the first ones to go are the marginal operational activities, such as laundry, cleaning and catering services. It is easy to add information systems to this list, but it seems that this is often done without careful enough consideration. Outsourcing is too often seen as a trendy, obvious and easy solution, which has been supported by financial facts in the short term. However, many examples show that even in basic operations support for outsourcing can become a costly option, not to mention lost possibilities for organizational learning and competitive positioning through mastering of information technology.

It is maintained that the governance problems are most acute in public health care, for several reasons. First, there the total spectrum of different customers and diseases is met. No customers can be selected or neglected, and all are entitled to some basic level of care. The possibilities to collect more resources through customer fees or through financial market operations are limited (Suomi & Kastu-Häikiö 1998). Compared with special care units, the activities are fragmented and performed in smaller, less well-equipped units. Compared with the private sector, commercial thinking is less mature: outsourcing for commercial actors in the health care industry is a natural topic as the private companies themselves are just those to whom activities are outsourced.

It seems quite clear that keeping the IT activities in-house demands certain resources and skills, but, similarly, outsourcing them cannot happen without any resources and skills being dedicated to this purpose. It also seems that very often small entities are in a dead-end situation: not enough expertise and resources for either in- or outsourcing.

5.5.2 The concept of governance structure

The concept of governance structure is by no means settled or well defined. The governance structure is defined here as:

"a structure giving meaning and rules to an exchange relationship".

Lately there have been many papers simply stating that governance structure is the same thing as management. Governance issues would be those of

management issues. We strongly believe and stress that management is a different concept from governance structures, when of course management is needed in the case of governance structures, and governance structures exist in management too.

The definition above conveys many details. First, the term structure refers to something stabile that will last over a period. Governance structures are sure to change over time, but economizing exchange relationships necessitates that governance structures are of a lasting nature. If governance structures were to change all the time, no exchange relationship would be on a permanent basis.

With meaning and rules, both the motivation and guidance functions of exchange relationships are referred. As governance structures are there to guide exchange relationships, it is natural to expect that they try to foster them. As meaning refers to something meaningful, governance structures obviously try to eliminate negative behavioral effects in exchange relationships, such as opportunism (Conner & Prahalad 1996; Nooteboom 1996; Genefke & Bukh 1997; Lyons & Mehta 1997; Dickerson 1998), bounded rationality (Simon 1991) and information asymmetry (Wang & Barron 1995; Seidmann & Sundararajan 1997; Xiao, Powell & Dodgson 1998), moral hazard (Jeon 1996), small numbers bargaining or negative network externalities (Koski 1999; Shapiro & Varian 1999; Kauffman, McAndrews & Wang 2000).

The rules or guidance functions contain three types of entities:

- rules on how an exchange relationship can be entered into
- rules on how to perform an exchange relationship
- rules on how to control and follow-up an exchange relationship.

For example, certain exchange relationships can be reserved for qualified partners. Certified partners are entitled to run many transactions, say buy and sell options in stock exchanges or sell medicines. Rules on how to perform exchange relationships can be many and detailed. As a control mechanism should be seen as a permanent entity, it should have some control mechanisms that will foster successful exchange relationships and eliminate bad exchange relationships in the long term. To take a fanciful example, the www site looking for flawed health care information - Quackwatch (see (*Quackwatch www-site* 2003)) - is an example of the guidance functions of an exchange relationship.

Finally, the *exchange relationship* can be understood in many ways. First, an exchange relationship can be seen as a transaction, where the relationship between the transaction partners is usually both short and well defined. The other end of the continuum is a long-term relationship. Further, the exchange relationship can be onerous, or happen without visible or instant payment. The object of the exchange relationship can be anything, including information, which role of course gains in importance in the information society.

Missing governance structures can be a major problem. Take for example Eastern European transition economics. Missing regulations and infrastructure elements severely hamper trade and any exchange relationships, as documented in (Kangas 1999). The same is true for the new eBusiness, where many environmental factors for exchange relationships are still underdeveloped, making actions in the new economy risky ones.

This leads us to ask who is responsible for the governance structures. The distinction has to be made between *obligatory* and *selected* governance structures. *Obligatory* governance structures are something that must be taken into account and cannot be omitted. Binding legislation is a good example. *Selected* governance structures are picked up by the exchange relationship parties themselves. For example, exchange partners can select which channel (an information system for example) to use in the exchange, and in which currency the transaction will be settled.

Governance structures exist on many levels. Any exchange relationship between two parties needs some kind of governance structure. Even when organizing their own personal activities, people naturally use some kind of reference frame, a governance structure. A governance structure has a relationship to the roles individuals play. The same person is sure to behave differently, and to have different governance structures for exchange relationships, say in the roles of a husband, father or boss. Running the analysis on an organizational level, the definition can be made between *intra- and inter-organizational* governance structures.

Governance structures are used in many disciplines. Naturally, the topic suits to *political science*, where government of the citizens and organizations is a central topic. *Economics* is a natural place to study governance structures, and here it is very much about economizing exchange transactions (Williamson 1985; Williamson 1989), typical examples can be seen in (Mylonopoulos & Ormerod 1995; Madhok 1996). The most diverse and recent application area is *management*, including information systems management, where governance structures can be applied in many ways. As we discuss contracts, *law* is a natural background too. Contrary to the tradition in economics, management governance structures are not just used for economizing purposes, but exchange relationships can be seen as tools for many organizational goals. Typical managerial problems are resource allocation (Loh & Venkatraman 1993), eliminating risks in exchange relationships (Nooteboom, Berger & Noorderhaven 1997), motivating organizational stakeholders (Hambrick & Jackson 2000; Peterson 2000) or building trust in exchange relationships (Calton & Lad 1995), (Nooteboom 1996).

There are some major tools to establish governance structures (Figure 17). At the national and international level, *legislation* is the key concept. At an

individual exchange relationship level, there is usually a *contract* defining the exchange relationship. *Organizations* are strong mechanisms to cover exchange relationships inside them. Fluent exchange relationships are made possible by *information* (and information systems), *money*, *trust* and *cultural* customs, such as the organizational culture or trading conventions within an industry. These are also all elements of governance structures.

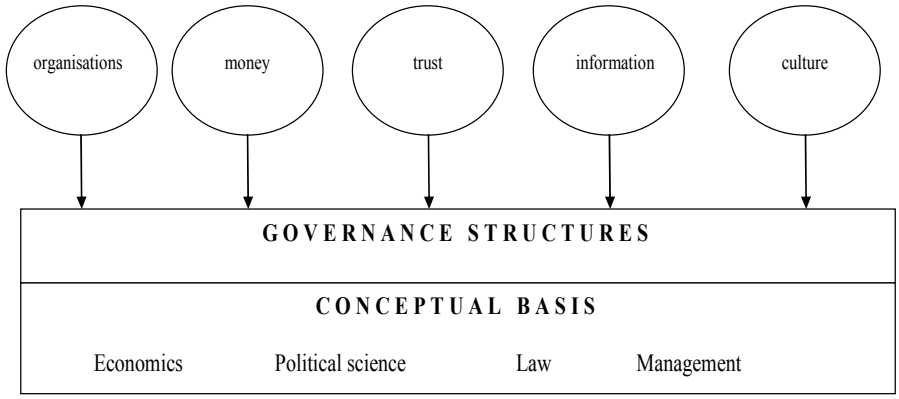

Figure 17 The main tools affecting governance structures and disciplines, providing the conceptual basis for studying them.

Using the term governance structure is by no means new in the health care sector. (Pelletier-Fleury, Fargeon, Lanoe & Fardeau 1997) have used the concept in connection with the process of diffusion of telemedicine. (Spanjers, Smiths & Hasselbring 2001) have studied the general networking or governance structure strategies of hospitals. Further, (Donaldson & Gray 1998) discuss how quality can be maintained through the smart design of governance structures. There is a rich research tradition in the new opportunities modern IS offers for organizing health care, see for example (Suomi 2001).

5.5.3 Tools for analyzing governance structures

Three disciplines for the study of governance structures are briefly discussed in this section. The first and most classical is that of transaction costs. Agency cost concepts are closely linked to those in the transaction cost analysis. An

established concept is also that of a value chain. Finally, trust as an element in governance structures is briefly touched upon.

5.5.4 Transaction costs

By recognizing that there is transaction cost in any market change, transaction costs economics extends the neo-classical economic perspective of the firm. The theory is based on the effort, time and costs created in searching, creating, negotiating, monitoring and enforcing a contract between buyers and suppliers. Transaction costs can erode comparative advantages in vendors' production costs. When assessing the substantial efforts and costs in supervising, coordinating and monitoring the activities of the vendor, it may decide that external sourcing is too costly (Ang & Straub 1998).

Transaction is a difficult concept that materializes on several levels (Figure 18). First, each transaction has its exchange object(s), actors performing the transaction, and some channel(s) through which the transaction is performed. These offer the basic ramifications for any transaction and its associated transaction costs. In general, transactions tend to be more fluent the better the channel for them and the more voluminous they are. In the literature, the main conceptual reasons for transaction costs are those of asset specificity, complexity of product description, bounded rationality and opportunistic behavior (Wang 2002; Clemons & Hitt 2004). From the concepts, there is still a long way to go to the actual measurement of transaction costs, which is a difficult task.

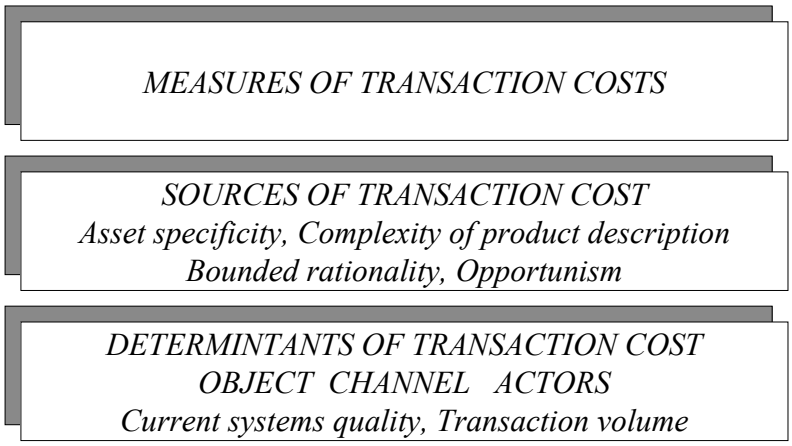

Figure 18 A tri-level transaction costs framework.

The emphasis of transaction costs analysis in traditional literature has been on moral hazard and holdup. Moral hazard occurs when a principal is seeking an agent to perform a task. If the effort is costly and measuring the result of the effort is difficult, the agent tends to put less effort into performing the task than is optimal for the principal and thus increases his own benefits and increases the principals cost. Holdup occurs when there are changes in bargaining power after the contract is signed and the other party wants to renegotiate the terms of the agreement. The emphasis has been placed on holdup arising from switching costs, which principally arise due to relationship-specific investment (Clemons & Hitt 2004).

The basic distinction of TCA among different organizational forms is the distinction between markets and hierarchies (Coase 1937), which are forms of economic organizations. Given the division of labor, economic organizations control and coordinate human activities.

A market is an assemblage of persons that tries to arrange the exchange of property, where prices serve as both coordinating guides and incentives to producers in affecting what and how much they produce - as well as the amount they demand. At the equilibrium free-market price, the amounts produced equal the amounts demanded - without a central omniscient authority(Alchian & Allen 1977).

In a hierarchy (firm), market transactions are eliminated and in place of the market structure with exchange transactions we find the entrepreneur-coordinator, the authority who directs production (Coase 1937).

In addition to these two basic forms of organizational design, research on the subject has produced several sub-forms of organizations. In the early days of the transaction costs approach, the focus was mostly on hierarchies, as this was the dominant governance structure. An example of this focus is A.D. Chandler's division of hierarchies into multidivisional and unidivisional structures (Chandler 1982).

The most important of the current developments of organization forms is the concept of groups or clans by (Ouchi 1980). He breaks hierarchies down into bureaucracies and clans. These two organizational forms differ in their congruence of goals. Clans have a higher goal congruence than bureaucracies, and are thus further along in their attempt to eliminate transaction costs.

Cooperative behavior among firms is the root of many success stories in today's management (Jarillo 1988). Like many other authors, he calls for a generally accepted framework for the study of inter-organizational systems. His contribution to the framework formulation is the concept of a strategic network. In discussing markets and hierarchies, he further divides markets into two segments: classic market and strategic network. The difference between these

two concepts lies in how transactions are organized: they can be based on competition or on cooperation respectively.

Thomas Malone introduces several other organizational designs. He studies organizational forms and their effects on production, coordination and vulnerability costs. Focusing on the internal organization of a firm, he introduces the following organizational designs (Malone 1987):

- product hierarchy
- decentralized market
- centralized market
- functional hierarchy.

In a product hierarchy, divisions are formed along product lines. In a functional hierarchy, similar processors are pooled in functional departments and shared among participants. In the realm of decentralized markets, different kinds of processors can be freely acquired from the market: processors supplied by different organizational units can be freely interchanged. In the case of centralized markets, freedom to choose remains but all processors must be collected from the same place.

Differentiation can be further done between six types of transaction costs (Casson 1982):

- information costs
- costs caused by requirement analysis
- costs caused by negotiating
- costs caused by initiating the transaction
- costs caused by monitoring the transaction
- costs caused by making the transaction legal.

Information and differences in information between parties seems to be one of the critical issues in transaction costs economics. However, the information asymmetry seems to be the key problem in most of the transaction problems. Environmental uncertainty, bounded rationality and other forms of information asymmetry also seem to be causes of transaction risks. Further, withholding and not sharing information can develop as a source of risk in an information relationship. This kind of opportunism occurs as selective disclosure or distortion of the data each party has access to (Clemons & Hitt 2004).

5.5.4.1 The value chain

One of the most established governance structure concepts is that of the value chain as presented in (Porter 1985). Since then, the concept has been widely used, but has also awoken a lot of criticism for its simplicity. The basic idea of the value chain is a one-directional flow of material and information in a

production process. The value chain emphasizes the resources needed for production but does not mention information or information systems, at least not explicitly. Analysis of the *flows of information, money and physical goods* is a key task for understanding any exchange transaction.

The strength of the value chain is its simplicity. It paved the way to the thinking that organizations should concentrate on the main value adding activities later called core competencies. The weakness of the value chain lies in its one-direction flow of activities. The value chain is unable to explain complicated market-based interactions, not to mention modern virtual organizations.

The value chain helps individual participants in exchange relationships to understand their place in the totality. It is too strong in focusing attention on the *value-adding elements* of any exchange relationship, calling for less attention to those traits that do not add value to the exchange relationship.

5.5.4.2 Trust

Trust is a general concept usable in all human activity. It is present in some way, most visibly when absent, in all exchange relationships. It can be defined as a one- or two-direction relationship between a human and a system, which, according to (Checkland 1981), can be one of the following:

- natural system, including human
- designed activity system
- designed abstract system
- designed technical system
- transcendental system.

With the first two, the Trust relationship can materialize in two directions: you can trust a natural system and a designed activity system, and one can trust you. Trust might be defined as an individualistic feature of human relations. Even in the case of Trust existing as interorganizational Trust, de facto it is Trust between those organizations' managers and their staff consultants. Berger and Luckman (1991) says: "*The most important experience of others takes place in the face-to-face situation, which is the prototypical case of social interaction. All the other cases are derivatives of it.*"

Trust is not a key concept in transaction costs economics. However, the discipline puts emphasis on at least two dysfunctional phenomena that exist in a transaction if Trust is absent:

- opportunism
- moral hazard

In this connection, Trust is a key element in the fight against transaction costs. As (Thompson 1967) cites: *"Information technology belongs to those technologies, like the telephone and money itself, which reduce the cost of organizing by making exchanges more efficient"*, and there could be added: *"Trust belongs to those technologies, like the telephone, information technology and the money itself, which reduce the cost of organizing by making exchanges more efficient."*

The basic conceptual tools offered by different disciplines to the analysis of governance structures usable for studying governance structures are summarized below.

The transaction cost approach:

- transaction as a unit of analysis
- basic governance structures: markets and hierarchies
- transaction costs and economizing them.

The value chain model:

- the value chain, the individual exchange relationship as a part of a totality
- flows of information, money and physical goods
- value-adding activities.

Trust:

- one- or two-directional relationship
- inter-personal and inter-organizational trust
- trust as an eliminator of transaction costs.

5.5.4.3 The public-private health care governance issue

In this section, the different role of private and public health care and the differences in their management and governance structures is discussed. The aim of this section is to sketch the complexity of public sector health care governance issues. This issue is made even more complex through the recent adoption of market thinking, business originated strategies and competition discussion in the sector.

When organizing their services, public and private health care use quite similar processes at the operational level. A visit to a nurse or a doctor because of ‘flu or a fracture generates very similar processes and transactions in both the public and the private sector. The same information and materials are needed in both organizations to cure the illness, so you could claim that the value chain is similar and produces same value to the organization and to the patient. The differences appear in money flows, but the basic cure process is very much the same.

However, when the organizations are studied at the upper, strategic level, the difference in the governance structures starts to appear. The public and private sectors differ from each other in several ways in terms of goals, decision making, fund allocations, job satisfaction, accountability and performance evaluation. Typically, public organizations have little flexibility in terms of fund allocations and very little incentive to be innovative. Rigid procedures, structured decision making, dependence on politics, high accountability by public and administration, and temporary and politically-dependent appointments are features connected to public sector organizations and employees (Aggarwal & Mirani 1999).

The private sector has different goals as they seek to enhance stakeholders' value and maximize profits. They are more flexible than public organizations in terms of budget allocation, personnel decisions and organizational procedures. Merit and award systems are mostly well defined and new ideas that maximize firms' value are encouraged (Aggarwal & Rezaee 1995).

As these definitions show, the difference is high, especially in organizing activities. While the public sector has to follow strict rules, private companies can organize their activities according to the market situation. When we look at the definition of governance structure and the words *meaning* and *rules* in it, the importance of the latter is very big in the public sector. Most exchange relationships have to follow strict rules, especially in purchasing: the public organizations have to organize a public competitive bidding when purchasing services or goods above a certain value.

On the other hand, the word *meaning* probably has a stronger emphasis in the private sector. Public health care organizations are guided by national politics and political decisions, which may be well thought of, but which are given from above and are thus more distant and abstract than strategies built by the organizations themselves.

However, because of several changes in the political and economic environments, as well as the changes in technology, the public sector is facing the same uncertain and turbulent environment as the private sector has always faced. In this new environment public sector organizations are expected to exhibit many features usually seen in the private sector, including some scope of entrepreneurial behavior. This shift has not been totally accepted in the public sector and there is a concern that the application of the language of consumerism, the contract culture, excess performance management and the use of quasi markets might create problems. It is argued that all these need to be balanced by approaches that recognize the value of the public sector (White 2000). The complexity is of course also dependent on the size of the organization. The larger the organization, the more administrative information is included (Spil 1998).

Increased complexity and a turbulent environment refers to the changing *structures* of the public sector. Until the last decade the structures of the public sector have remained quite stable because of governments' strong role in steering them. Starting from the 1980s, however, decentralization and local empowerment have invaded the public health care sector. Therefore, one could say that at the moment the structures in the public sector health care are not on a permanent basis; rather, they are in a turbulent phase. It might be that effectiveness cannot be achieved in the public sector because of the ongoing turnover phase of the industry.

One distinctive difference between the public and private sector, which cannot be bypassed since it greatly affects governance structures through management, is the group of stakeholders the sectors have to satisfy. While the private sector is to maximize the profits of the owners (to use a rough generalization), the public sector has more critical stakeholders. Of course, this is not so simple in the private sector either as the employees are a strong stakeholder group with their own interests inside the organization. Employee demands cannot be set aside. Yet, despite the differences, managers in both organizations must work to find the point where most of the stakeholders are satisfied most of the time. In many cases, increasing the satisfaction of one group of stakeholders decreases the satisfaction of others (Dolan 1998). This affects the structure of the exchange relationships as the stakeholders eventually decide (consciously or unconsciously) whether the relationships the organization maintains are in accordance with their demands.

Another view of the public-private sector governance structure is to discuss the issue from a national perspective. The private and public sectors share the health care markets, and the national government and legislation has a great effect on those shares. The obligatory governance structures play an essential role, especially in the public sector; it has many responsibilities that it cannot escape. Next, some features of the roles and market shares of public and private health care will be described using Finland as an example.

All health care services are mostly financed (60-80%) by the State or municipal taxation and the remainder by the National Insurance Scheme (10-20%) and co-payments. The private health care sector is seen as more or less complementing rather than competing with public health care. The markets for the private sector have established themselves slowly, mainly because of the extensive role of the public services. By 1996 the share of private doctor consultation in Finland was 16% of all doctor consultations and the share of doctors who practice solely in the private sector was 5%. The total share of private health care services was 22%. The private sector has the strongest market share in general practice visits, dentist and physiotherapist services, and in occupational health care (Järvelin 2002).

In Finland, health care authorities at the local level have gained more independence in organizing their governance structures since the State subsidiary system changed in 1997. Earlier, the rule was that local public health care should produce primary care as an internal service and that the State subsidy was granted on the bases of population, morbidity, population density and land area. Since 1997 the criteria have been changed and local authorities have gained more independence in organizing the services according to local needs. They have been encouraged to use methods and approaches familiar from the private sector business environment.

Some opposite developments have been seen at the international level. In European countries the need to strengthen the stewardship role of the State appeared with the introduction of new market mechanisms and the new balance between the State and market in health systems. Thus policy makers have sought to steer these market incentives towards achievement of social objectives (The European Health Report 2002, p. 126).

The government's target therefore is to both increase the independence but at the same time steer the development. This is a hybrid form of market and hierarchies where the market works with the rules set by an entrepreneur-coordinator (government) who directs the production (transactions).

5.5.5 The IT sourcing governance issue

Outsourcing is seen in many organizations as a means to get rid of everything unpleasant or unknown. The solution is good in some cases but in some cases it is also a way to loose even the least understanding and control of the outsourced activity. The solution is not so simple as it might sound. Many firms have made sourcing decisions based solely on anticipated cost saving without further consideration of its effects on strategies or technological issues (Kern & Wilcocks 2000).

IT outsourcing can be defined in the following way (Kern & Wilcocks 2000): *"IT outsourcing can be defined as a decision taken by an organization to contract out or sell the organization's IT assets, people, and/or activities to a third-party vendor, who in exchange provides and manages assets and services for monetary returns over an agreed time period"*. Kern and Willcocks stress the significance of contract and control in their article. They further underline that *"the client-vendor relationship is indeed more complex than a mere contractual transaction-based relationship"*. Control is also seen as an essential but complex issue in these relationships. IT outsourcing tends to be more complex than many other forms of outsourcing, such as cleaning, catering or calculation of salaries,

because IT pervades, affects and shapes most organizational processes in some way (Kern & Willcocks 2002).

The tools for analyzing the governance structures described earlier included the element of trust. Contracts are used in an attempt to reduce mistrust. With a comprehensive and mutually agreed contract, the trust can be improved, but no matter how comprehensive it is there is always a possibility to understand it in different way to the partner. As trust is a individualistic feature of human relations, a contract and, especially its reading, is a result of this feature: you (the individual) can interpret it to your own benefit if needed.

Thus outsourcing first needs a good contract. Another main issue in outsourcing is control. As long as you have your information systems insourced, the biggest concern is to control the professionals in the department. They have to be skilled and motivated, and they have to have enough resources to perform their work. However, it is mostly a matter of technology and personnel management. Of course, you also have to ensure the quality of the outcome in a way that serves the organization most effectively.

When outsourcing, the management loses a part of this control. New issues connected with trust, like opportunism and moral hazard, are emerging and these are a lot more difficult to control. In outsourcing the contract is juridical between two organizations, but the trust is always emerging (or not) between two individuals. Therefore, choosing the people to negotiate and consummate an agreement is not a trivial matter. In addition, those people have to be familiar with the technical and juridical issues of the contract; they also have to have some knowledge of human nature and meeting techniques.

5.5.6 Conclusions on the governance structures in health care IT

A carefully and intelligently defined and implemented governance structure bestows a lot of stress on organizations and their management. However, in a constantly turbulent environment no organization is a running machine that does not need maintenance. Governance structures are a means to control exchange relationships, but in rare cases a means to totally automate them. In the popular outsourcing literature and marketing in particualr, outsourcing is pictured as a panacea for getting rid of management troubles - say in a complicated case of IS management. However, as we know, this responsibility of management cannot be escaped.

Exchange relationships are the value-adding activities of organizations. Governance structures give meaning and rules to them. Exchange relationships are there to add value to all partners, but unfortunately also contain costs and risks. For an exchange relationship to take place, the added value produced must

be bigger than that of the transaction costs for each partner, taking into account his/her/its risk profiles. In just few simple transactions, the total outcome of the exchange can be counted beforehand, if even afterwards.

Value chains are a typical tool for analyzing governance structures and the exchange relationships happening in them. Their task is to show the total flow of activities, be it a case of information, material or money. With a value chain, each individual actor can understand its place in the totality. Value chains are too strong in their focus towards value adding elements. If an exchange relationship does add value to anybody, it should not happen. Governance structures should be there to eliminate non-value-adding elements from value chains. This is too often forgotten.

Trust is a concept that is currently heavily studied, but too seldom in the field of governance structures research and practice. For us to produce a metaphor, trust is the glue that keeps governance structures together and the grease that makes them fluently serving exchange transactions.

The pressures on health care are many. Many of these pressures would have emerged despite IS, but in many cases IS has even emphasized those pressures. On the other hand, IS offers many new possibilities to build governance structures. Finally, IS is a resource and exchange relationship a field to be governed. IS also has three roles in their relationship with governance structures:

- Emphasizer and visualizer of pressures towards governance structures in an industry, say Health care.
- Facilitator of new governance structures to handle exchange relationships.
- An exchange relationship field to be governed.

Many see privatization as a panacea for all the problems in most industries, including health care. However, in many respects, private organizations are faster and more flexible in their activities, but health care also has many characteristics that mean activities there cannot be solely left to market forces. This is not to say that public organizations should not try to learn the best practices from the private sector.

A whole book could be devoted to the discussion of health care IS sourcing decisions. The fact seems to be that all health care organizations are compelled to outsource at least some IS functions. They simply lack the expertise. However, fine-tuned thinking is needed in this sector so that the core competencies of health care are not outsourced. Modern health care is as much about management of information as about the patient, diseases and their cures. Infrastructure-oriented IS tasks could and should be outsourced, but not the whole task of knowledge management.

Our cases handled two organizations of different sizes. The smaller one even had difficulties in finding resources to outsource basic IS – even this process

needs careful management. The bigger organization outsourced IS infrastructure management and searched for possibilities to redesign governance structures in other fields. The success was visible to some extent, but the number of available options seemed to be beyond the scope of the organization. Again, management time and energy was a scarce resource.

Here is the summary of the conclusions:

- Governance structure is not a means to get rid of management responsibilities, but to handle them.
- Governance structures give meaning and rules to exchange transactions.
- In exchange transactions, risks and transaction costs are lowered.
- Value chains are useful in defining exchange relationships; added value is emphasized.
- Trust is a central resource in any governance structure; trust is the glue and grease of governance structures.
- IS acts as both a challenger and a solution in health care governance structures.
- Public health care organizations are under pressure to adopt market-like governance structures from private institutions.
- IT tends to be outsourced in modern health care.
- The bigger the health care organization, the more diversified the possibilities for outsourcing.

5.6 Expected IS benefits of different stakeholders – defining failure or success?

5.6.1 The role of stakeholders

The growing conception is that identification and understanding of the wants and needs of stakeholders is vital to any strategic management (Blyth 1998). In health care there are several different organizational levels and interest groups that all have various and subjective expectations about IS investments. This mix of expectations and viewpoints makes it difficult to evaluate whether the IS investments are really effective and successful. By understanding the differences in expectations it is easier and meaningful to both focus the investments and evaluate their success. In the industry of scarce resources both dimensions are essential to avoid false investments and fruitless and quarrelsome discussion about the focus of investments. The point is to understand from whose eyes the success is measured.

As there are several stakeholders in organizations there are also several viewpoints in studying the success of IS - user satisfaction is considered one of the most important measures when the success is assessed. DeLoane and McLean's (1992; 2003) IS success model is probably the best known categorization of the success factors. The focus is to find reliable and independent measurable variables (e.g. extent of user participation in the planning process or the level of IS investments) and, based on them, to explain the behavior of a dependent variable (success). Evaluating IS success from viewpoint of the productivity of IS investments has been a challenge for practitioners and academics for decades. The discussion started with stronger effort after the concept productivity paradox was presented in 1990 (Strassman 1990; Brynjolfsson 1993).

Public health care forms its own specific environment in a productivity research area. The complex, highly professional and hierarchical information-intensive and dependent environment sets high requirements for development and changes. To add to this, the complex and politics-based public decision-making process makes the area even more complicated. Different interest groups in such organizations consider IS investments and benefits through different glasses. Those who are responsible for IS development have different expectations to those who use it or are a target of its use. IS success or failure is thus often seen as a general failure in the eyes of some group (Lyytinen &

Hirscheim 1987).The management of any IS includes social values, which are mediated through the system via resources. However, in health care the social values of the stakeholders are maybe more important than in any other industry. The identification of social values, the identification of stakeholders who mediate the social values and identification of the resources that act as a token for the social values are important in determining the failure or success of the system. To be able to develop a manageable IS there first has to be identified requirements associated with the social values the system is going to mediate; second, the stakeholders who will perform the mediation; and third, the resources that are required for the mediation (Blyth 1998).

The difference in perspectives affects the level and focus of the criticism. Therefore, to be able to handle the criticism and react to it, you have to first understand the kind of relationship the critic has with the system. Subjectivity is always present in evaluation, especially in cases where the evaluator forms his conclusions based on everyday experiences of the system. Subjectivity is also very often influenced through setting high pressures on IS as a problem solver. When expectations are lifted to an unrealistically high level, the results, no mater how good they are, can feel mild (Sharma & Sheth 2002) or even a failure.

Attempts have been made to explain IS failures in various ways. However, the explanation usually only includes one aspect of failure. Lyytinen and Hirscheim (1987) list some of the failures based on earlier literature, like the potential benefits are not realized, IS is not used, the user's attitude is negative, substantial user resistance and a functioning system is not delivered. They also raise a question about what is meant by failure and what is meant by success in general. This will be discussed later. To this could be added the question of who defines the failure and success.

Next the concepts of success and failure, stakeholders in health care and the development of expectations is described.

5.6.2 How to define a failure or success

Lyytinen and Hirscheim (1987) divide failure into four different categories. Although their categorization is almost twenty years old, it still fits the modern IS environment and, especially, health care since the industry is still in the early stages of considering IS exploitation. Thus the way they analyze the causes and mechanisms of failures is still usable. The four categories are:

- correspondence failure
- process failure
- interaction failure
- expectations failure.

Correspondence failure is the one of the most popular definitions of failure. It typically emphasizes the management view of IS so that the goal of the IS development has been set beforehand and if the goal is not met, the system has failed. The belief is that the goals of IS plans are objective and formal, and the realization can be measured accurately. However, this often leads to the use of different control mechanisms like cost-benefit analysis and cost-accounting techniques. Correspondence failure has proved to be too idealistic in practice. The requirements set by management are often ambiguous and blurry, and even conflicting (Lyytinen & Hirscheim 1987).

There are two aspects in defining process failure. First, if the IS project cannot produce a workable system, it is a failure. Second, if the project develops a workable system but the timetable or budget is overrun, it limits or negates the benefits of the system. This category of failure relates to the problems of management in predicting the required resources, evaluating the proper budgeting schemes for the project and predicting the possible problems in the project. This viewpoint is very common among IS professionals and project leaders (Lyytinen & Hirscheim 1987).

The third failure, interaction failure, suggests that the low level of IS use is a signal of IS failure. The idea is that if the system is used by the users, they are satisfied with the system, their attitudes toward the system are positive and the effectiveness of their work is better. However, there is little evidence that the high usage rate is an indication of effectiveness and satisfaction. The problem is that the measurement doesn't necessarily tell what the users do with the system or how they perform their tasks (Lyytinen & Hirscheim 1987). However, numerous different methods and models have been developed to evaluate the use and effects of the use, which can also explain the interaction failure. These are, e.g., User Information Satisfaction (UIS), End User Computing Satisfaction (EUCS), the Technology Acceptance Model (TAM) and the Information Systems Success model, which connects different indicators and synthesizes them in the model (Bailey & Pearson 1983; Doll & Torkzadeh 1988; Davis 1989; Adams, Nelson & Todd 1992).

The fourth category of failures is expectation failure. The reasoning behind expectation failure is that the system is a failure if certain goals that follow certain values cannot be met. The difference in values can create a situation where the system is at the same time a failure and a success, depending on the point of view; the system can be successful from the user perspective event though it is difficult and expensive to maintain (Lyytinen & Hirscheim 1987).

Hillam and Edwards (2004) pose that the interaction and expectations failures are difficult to measure. They claim an implicit assumption that there should be clear goals set and measured, and the there should be some common understanding of user attitudes and expectations. Further, the number of

expectations can increase when the number of stakeholders increases during an IS project in inter-company systems. Consequently, the number of varied expectations makes the area hard to measure and evaluate.

However, since the goal of this chapter is to identify the stakeholders and define the concept of expectation, the difficulties in building measures for expectation failure is in a minor role. The concept of stakeholders and expectations is discussed in more detail next.

5.6.3 Stakeholders in health care

The neo-classical theory of a firm traditionally emphasizes the role of the owners and their profits, and how the company can maximize them. According to the theory, there is a perfect competition in the markets (Kangas 2000, p. 47-48; Barney 2001). This thinking is poorly suited to the public health care area. Even though there are owners in public health care (municipals), they don't have an interest in getting maximum profit – actually, they don't expect profit at all, at least not in monetary terms. But the interest of the public owner in following the cost of the service production has grown with the need to produce them effectively. So, although the owners don't invest their money in better profit expectations if the organizations are not profitable, like in the private sector, they do expect profits in the form of savings and better care results. Quality and effectiveness should increase while the resources are decreasing and the demand is growing. This viewpoint, however, emphasizes stakeholders from a very narrow perspective.

Nonetheless, the stakeholder division in the IS environment has usually been quite simple. The division is made between users, management and IS professionals. However, this division is quite simplistic as it mainly conveys the prescriptions associated with the design of IS. The viewpoint does not actually tell much about the actor's actual interest in IS. Rather, it focuses on intended and observable aspects, ignores conflicts inside the groups and ignores the IS effect on the organization's members' interests (Lyytinen & Hirscheim 1987).

Lyytinen and Hirscheim (1987) suggest four criteria for defining the IS environment, which may help in identifying the IS stakeholder groups in the organization:

- The nature of IS.
- Type of relationship to IS.
- Depth of impact.
- Level of aggregation.

The nature of IS infers that IS should be seen from many perspectives. Those perspectives can be a sophisticated piece of technology, a communications tool, a

decision-making tool, a control mechanism, etc. Different roles can be seen in each perspective.

The type of relationship can be producer, consumer, sponsor, regulator or user. The depth of impact can be direct or indirect. The level of integration can vary from one situation to another, like distinguishing between individuals and groups in larger entities like organizations (Lyytinen & Hirscheim 1987).

The division of stakeholders in a strong profession-based industry like health care has more depended on the clear division of profession-based groups. According to Kumar and Subramanian (Kumar & Subramanian 1998), five most important and powerful stakeholders can be identified in health care. These five stakeholders are presented in Figure 19.

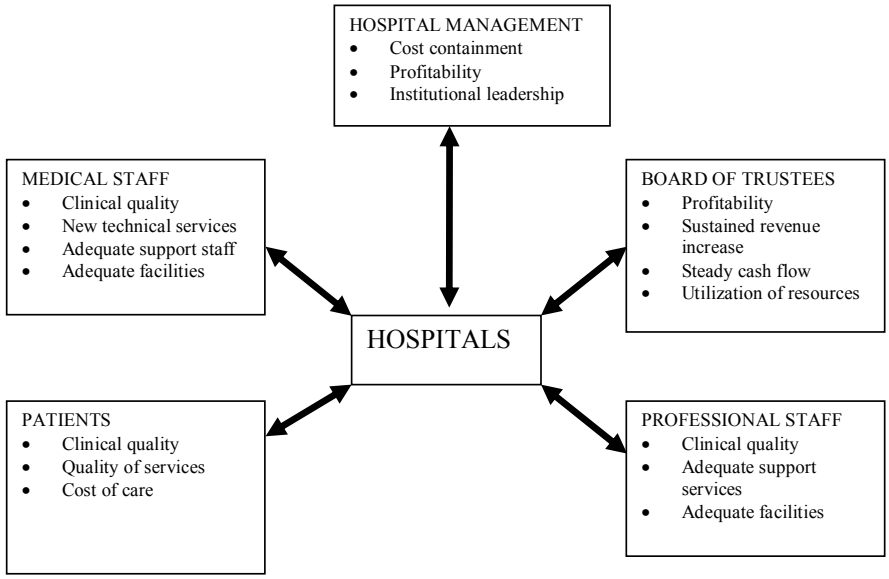

Figure 19 Dominant stakeholders' expectations map (Kumar & Subramanian 1998).

The medical staff's expectations are primarily related to high clinical quality and adequate support services. Patients care about clinical quality, but they are also concerned about service quality and low costs. The expectations of hospital management include cost containment, profitability and institutional leadership. The primary concerns of the professional staff are also clinical quality and availability of adequate services and facilities. The Board of Trustees, which possesses formal control of the organizations, is interested in profitability, maintaining a steady stream of revenue and cash flow, and effective utilization of resources.

In the eyes of the stakeholders, the investments in information systems in public health care have to be as effective as in the private sector. An alternative investment always exists, which might bring more value to the organization and would therefore be more profitable - meaning that they have to produce better and more effective health services. The pressure comes from both inside and outside the organization. So the stakeholders, if understood as above, can be the determining factor, even though they are not in an owner position.

Turunen (Turunen 2001, 205-209) developed a category of stakeholders in his research on the evaluation of health care informatics. According to him, stakeholders identified in the previous theories can be specified according to professions and/or the educational background related to the profession. The professions and paradigms thus act as subcategories for the IS evaluation:

- Users
  - clinicians
  - nurses
  - support staff for care.
- Managers
  - with health care background
  - without health care background.
- Developers
  - with health care background
  - with IS background.
- Patients
- Outsiders
  - financiers
  - suppliers
  - others.

Turunen primarily includes the first four in his categorization of IS evaluation stakeholders while the outsiders are not seen as part of the evaluation stakeholders group. Outsiders are seen as a group who affect the evaluation (like researchers or financiers) but are not directly employed in the organization. The categorization was mainly developed for the purpose of IS evaluation in a health care organization and emphasizes features of each group that should be considered when starting an evaluation project. However, the notion of the role of education and profession as a base for the stakeholder division is important. Although some areas between professions are similar, there are also differences caused by paradigms that are learned in the education stage and later when the profession is practised. The information needs of the stakeholders differ according to their profession.

5.6.4 The emergence of expectations and stakeholders by defining the value concept

The stakeholders' interests are developed through a number of expectations, beliefs and desires concerning how the system should serve those interests. The expectation toward system performance is dependent on how much the user is going to benefit from the system (Venkatesh, Morris, Davis & Davis 2003).

It is believed that individuals form their beliefs in the use of IS from a broad area of influences, such as the individual, institutional and social contexts in which they interact with IS. However, there is no clear understanding of how those three factors collectively shape the individual beliefs. The positive assumption about the ease of use usually improves, as do the assumptions about the system's usefulness (Lewis, Agarwal & Sambamurthy 2003).

In the introduction to this chapter there was a short discussion of the role of values in defining the expectations, failures and successes. Expectations represent evaluative dispositions that are derived from the stakeholders' common pool of value. Expectations are sometimes expressed vaguely and are seldom rationalized or verbalized as a real concern. This might be a consequence of the great number of stakeholders, stakeholders' inability to expose their expectations because of organizational barriers, dominating ideology, lack of time or interest, or by unclear content of the expectations. However, some of the expectations are always presented explicitly to justify the investments in IS (Lyytinen & Hirscheim 1987).

The standards and goals introduce the values in IS and more concretely define what should be achieved and how. Values often seem to be conflicting and ambiguous, which, in turn, increases the need for pluralism. The values define that IS failures happen when the goals that would coincide with adopted values are not obtained. But since the values can be conflicting and ambiguous, there can also be different opinions about the failure (Lyytinen & Hirscheim 1987).

The values usually consist in a group rather than in the realm of an individual. Thus the group that shares the same pool of values can define the desirable features of an IS and how those features should be obtained. These kinds of groups can be said to constitute stakeholders. The stakeholders can be defined as all those claimants inside and outside organization who share a common view of a problem and how it should be solved. Thus the definition proposes that there are no general IS failures but IS emphasizes the problems of someone or some group (Lyytinen & Hirscheim 1987).

The stakeholders' values mainly come from their own interests. Thus it can be said that "*stakeholder groups attempt to control organizational resources which enable them to channel organizational action to outcomes that advances their interest."* Those interests are vested, though the interest may be shared with

several stakeholders and are thus common interests (Lyytinen & Hirscheim 1987).

The essential area is how the stakeholders and their values are identified. The stakeholders can be viewed in two ways. In the first, each actor's belief that he/she has a stake in a certain group defines which group she/he belongs to. In the second, the structural features of the situation, without considering the actor's own beliefs, defines the group. The latter emphasizes the structural arrangements and associated interest in the actors' social space (Lyytinen & Hirscheim 1987).

5.6.5 Summary

The definitions of the identification of the values of stakeholder groups suggest two points of view. The first is based on the individual's own perception of the values and groups, and the latter emphasizes observed structural arrangements and associated interests in the social space. In health care, where professional borders and tasks define the stakeholders, the identification can be seen more easily.

However, as mentioned in the critiques by Hillam and Edwards (2004), the gamut of stakeholders can increase considerably during the implementation and diffusion of IS. The number of stakeholders in health care is large. In addition to the health centers' internal organization there has to be considered at least the patients, municipality, State, insurance sector, other health care organizations. etc. Thus the division of stakeholders into just professions or tasks might be difficult. The group could be, e.g., doctors and nurses and other staff, but, on the other hand, the effects of IS can be seen from the viewpoint of laboratory unit, doctor's reception or the State health care planning level. In addition, the viewpoint of this thesis is strategic management, from which point of view the structural division should be chosen. In the strategic approach, stable, long-term and enduring social structures have to be considered more than the individual's own belief, which will probably occasionally change.

The aim of this chapter was to discuss the expectations of wider interest groups than just the health care unit, which differs from the earlier research above. For example, the expectations at the Ministry level do not include the usability of diagnostic systems but do expect that the IS will be developed considering the nation-wide compatibility requirements of IS or the goals of the national health care IS strategies. Therefore, the division has to include the strategic area, and the operational level has to be considered from a wider and simplified perspective.

For this reason, the division of Kumar and Subramanian (Kumar & Subramanian 1998) fits well, but it lacks the dimension of State. Turunen's

categorization was mainly developed for the purpose of IS evaluation projects within an organization and thus includes mainly internal stakeholders, though the category of *others* can also include external stakeholders like the State or other health care organizations in the public, private or a third sector. The need and the scope to define the stakeholder groups depend on what kind of viewpoint the study adopts and which opinions on expectations are essential to the usability and general usefulness, profitableness and acceptance and development of the system. In this kind of study, where the viewpoint is strategic, the extent of different stakeholders might be broad, as will be seen later in the empirical part in Chapters 6 and 7.

6 DEVELOPING AN INFORMATION MANAGEMENT STRATEGY FOR THE PAIMIO – SAUVO FEDERATION OF MUNICIPALITIES

This chapter presents the empirical findings of the Paimio-Sauvo health care federation. The chapter is divided so that the case organization, the research project and then the data collection are described first. After that, the case is discussed on the basis of the framework presented in Chapter 4 - the main functions and problems related to each management area are presented and then the resources that are needed to improve the organization's IS management are discussed.

6.1 The case in detail

6.1.1 The background to the Paimio-Sauvo IS-strategy development

The first case organization in this thesis is the Paimio-Sauvo health care federation of municipalities. The research took place during the years 1998 and1999.

The P-S is located in southwestern Finland, and is formed by the City of Paimio and the municipality of Sauvo. It serves about 13,000 people, and offers basic health care services. The main health centre (community hospital) is located in the City of Paimio, and a smaller health centre is in the municipality of Sauvo. The total number of employees is about 100, of whom eight work in Sauvo health centre.

The functions in P-S are divided into five departments:

- administration and service
- outpatient care
- institutional care
- supportive services
- environmental health care.

P-S-type medium-size communal health centers were among the first to adopt the new electronic patient records (EPR). The implementation of the systems increased considerably at beginning of 2000 (Hartikainen et al. 2002; Winblad et al. 2006). The new system brought several advantages in the administration of the ever-increasing pile of patient information, but new problems also appeared. The problems did not necessarily emerge in the implementation stage, but later when the system was developed further. The investments were considerable and expectations towards the new system were high from several interest groups. Thus actions were required when the results did not always meet the expectations. Decisions were sometimes made without a strict plan and under pressure, and were not necessarily considered carefully enough. This result even more complex system to manage and develop. The clue for total long-term development was missing.

In P-S the changes in Finnish health care environment (see chapter 3.1.2) resulted in a decision being made in 1995-1997 about changing the steering system between the municipalities and the health care federation. The old steering system, which was based on a fixed agreement between the municipalities and the federation, was changed to a broader purchaser-provider model. The new agreement meant that the municipalities, as the buyer of the services, were to decide what services would be offered to the citizens and where they were to be acquired them. The health care federation was only acting as a provider of health services.

To be able to choose the most optimal service, the municipalities of Paimio and Sauvo had to get information from service providers on the cost and content as well as the quality of their services. This forced the P-S health federation, as a service provider, to clarify the structures of their services and processes to be able to present the real costs. EPR was expected to offer a solution to better support the decision making and better cost awareness since all the information on treatments would be stored electronically in one place and thus easily accessible and processed.

The financing system was also changed according to the agreement. Previously, the municipalities were basically paying the federation according to the total expenses. In the new system the costs were based on the actual production cost of the services. Certain services had set prices, which the municipalities were paying to the federation when the service was offered.

At the same time, P-S made some changes in its organization structure. The previous structure was based on professional groups and was changed to a more customer-oriented structure based on service divisions. There were five service divisions in the new structure, with responsible managers and one executive manager responsible for the overall development of the organization. This structure was also a basis for new IS steering group that came later.

The changes in legislation and organization were documented in the organization strategy. The strategy was well developed and gave good grounds for creating an information management strategy.

To summarize the background and the starting points, it could be concluded that P-S had good knowledge of the changes in the health care sector and had prepared for the changes with a well-argued strategy and a new organization structure. The strategy had already considered the possibilities of IS in achieving the goals in the strategy, and had also motivated and engaged management to achieve them.

The downsides were the organization's small size, lack of business-like management perspectives and knowledge of the effects and development of IS. An organization of relatively small size could not have an IS organization of its own and, as outsourcing was not considered a possibility, it would have needed knowledge of competitive bidding and contractual agreements. In addition, the staff started to get tired of continual new projects and there was a fear of increasing resistance to everything new.

6.1.2 The process of the IS strategy development

The goal of the IS strategy was to clarify the current situation and map the future trends and potentials of IS. The business strategy already gave good grounds for defining the key points, the development of which was fundamental in the new situation in the federation.

The main task of the new IS strategy was defined: the technology of medicine and care and information technology in general has to support a seamless care chain to effectively produce added value for the customer. Information technology should help the municipality (customer) by producing knowledge about the content, scope, quality and costs of the health services.

The research group consisted of two researchers and a professor as the manager of the research from the department of information systems science at the Turku School of Economics. The writer of this thesis acted as a responsible researcher in the project and collected and analyzed the information from the organization. However, the whole research group participated in the planning of the research and the definition of the interviews.

A research steering group was established in which there were participants from the federation and from the Turku School of Economics. The attendees from the federation were the manager of the federation and the managers of the divisions of outpatient care and dental care.

The steering group included following members:

- Paimio-Sauvo health care federation of municipalities.

  - Jussi Päkkilä, managing director of the federation.
  - Ritva Päivärinta, manager of the outpatient division.
  - Leena Teräsvasara, manager of the dental care division.
- Turku School of Economics
  - Reima Suomi, professor in information systems science.

The researchers were Pekka Turunen and Jarmo Tähkäpää from the Turku School of Economics. Both researchers were present in the steering group meetings. In addition, there were varying participants in the steering group from different areas of the federation who were invited when some special item needed more specialized information. The steering group met once in a week during the spring of 1998 and more sparsely when needed in the autumn of 1998.

The framework used in the IS strategy development was developed in the Turku School of Economics and Business Administration led by Professor Tapio Reponen. It is called the EMIS model (Evolutionary Model for Information Systems Strategy Design) and had been used successfully in numerous private companies (Reponen 1993a; 1993c; 1994; Viitanen 1998; Kangas 1996).

The basic assumption of the EMIS model is that information technology has an increasingly competitive importance and a company should find its edge. However, IS should not be overemphasized but should be seamlessly aligned with the overall business strategy. An enterprise's management should be forced to consider and understand the IS possibilities in the company. Only in that way is the effective use of IT possible (Reponen, Ruohonen & Suomi 1990).

According to Reponen et.al. (1990), a good strategy should be based on a combination of:

- Management vision: IS strategy is closely linked to business strategy, which is based on the top management's view of what the company should be in the future.
- Information technology: technology that is developing alternative ways for doing business must be continuously monitored, and the IS function should be constantly aware of the market situation.
- Theoretical knowledge: the participants in the IS strategy formulation should constantly be aware of other organizations' experiences in the area.
- Practical knowledge of IT applications: the successes and failures in the area should be known to the organization.

During the strategy generation process all participants in the organization should have internalized it. Through this, the strategy is easier to implement. Strong involvement in the project also gives the participants a feeling of the strategy being their own. Understanding the integration of business and IS

strategies is a matter of learning by doing, and business management should create an environment where this learning is possible (Reponen 1993a).

The fundamental premises of the EMIS model are (Reponen et al. 1990; Leino 1995, 44):

- The project must have management support.
- All three essential interest groups (top management, operational management and information systems management) must take part in the project and support it.
- Information systems design must be based on the current situation, i.e. the design itself is an evolutionary process.
- Information systems and business goals must converge.

The model (Figure 1) cannot be perceived as an exact how-to algorithm for IS strategy formulation, but more as a mental construct of agendas to be taken into account in planning and maintaining IS strategies (Kangas 1996, 92-93).

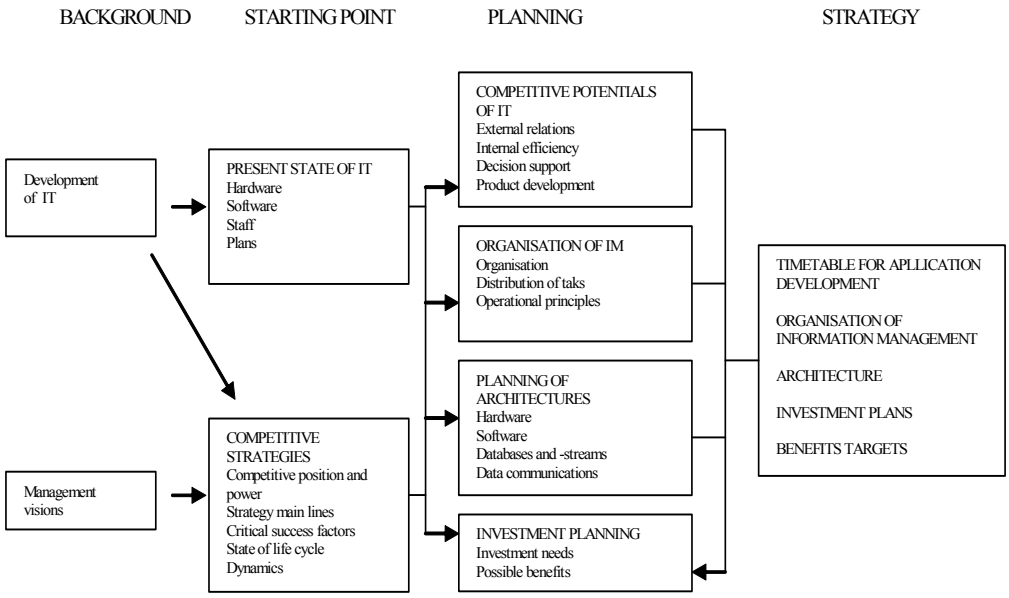

Figure 20 The Elements and Process of the EMIS model (Reponen et al. 1990).

Next, the phases of the model and its relationships to P-S IS development are briefly explained. The first stage emphasizes the identification of the background of both the organization and the IS sector. Since the Turku School of Economics had little experience of doing research in health care, this stage was completed carefully and quite comprehensively. The first interview round familiarized the

research group with the current state, developments and future of the federation, both municipalities and the health sector in general. The organization strategy was analyzed in order to get an idea of the management's long-term plans and visions.

The second phase included the clarification of the current state of IS in the organization and the organization's competitive strategies. The EPR system had been in use for eighteen months. Although it was at the heart of the IS in the organization, there were several independent applications there had no connection to EPR. To find out what the role of each application was, what information it produced and to whom, how it was updated, etc., was a quite challenging task. Some applications only had one or a few users who had the best knowledge about the application, which created a risk of loosing the information if the user left the federation for some reason.

As mentioned earlier, the organization had a good and well reasoned organizational strategy. To sort out the components of the strategy was quite an easy task. However, since health care was a fairly new area for our university, there was a need to clarify some issues in the strategy. This stage also taught the research group a lot about the area.

The next phase in the EMIS model is the planning stage. In this stage the first thing is to recognize the competitive possibilities of IS. One of the tasks of EPR implementation in the federation was to offer better information on the costs and structures of the services to better serve the needs of the owners (municipalities). It was hoped that the new system would generate better information for the use of financial administration. In general, it was hoped that the system would offer better information for the decision-making and development of the organization.

The next item was to organize the IS management. The management of the IS function should be clear to both the management and the staff. In that way, the development of IS and solving the problems becomes remarkably clearer. One of the problems in the federation's IS management was that the managing director, who had neither time nor expertise to fulfill that task, had overall responsibility for the system development. There was also one clinician who had specialized in EPR in her own time and was an important contact with the EPR supplier. In addition, there was a part-time IT support person who only visited the health centre about once a week or even less. Thus the IS organization could be said to be quite unofficial, although user support was organized despite these problems. A new organization was developed during the research and the tasks were addressed more clearly.

The IS architecture tells the organization what the current situation is and in which direction it should develop its systems. The IS architecture in the federation was not very clear. The hardware was quite old and there were no clear plans on what kind of hardware to provide. The applications' architecture

was scattered. The current architectures were defined in the research, together with what the architectures should be after a few years, and some of the stages in between.

The investment plan tells the management what kind of investment needs can emerge, what the central investment targets are in the short and long term, and helps the organization to plan its IS financing more accurately. The IS investment depends on the general development of the federation and the development of health care legislation and instructions, and these were considered in the strategy. The IS investment strategy should also tell what kind of benefits the investment would bring in the short and long term.

The last stage in the EMIS model is the strategy itself. According to the previous stages, it should include all the areas of how the IS should be developed in the future.

In summary, the strategy included following areas:

- basic operational principles of IS
- the management of IS
  - IS steering group and internal ownership of the IS resources
  - regional IS organization/co-operation
- staff IS training
- communication and information sharing
- IS architectures
- steering of economic information on IS investments
- investment strategy.

6.1.3 Data collection and sharing results

The methodology in the research case was action research. The goal was to develop a strategy that the organization could use in developing its activities. The model used in this goal (EMIS) was previously used in private sector IS development and was now being applied in a new environment. The basic feature of the action research by Benbasat (1987), namely to participate in and influence the organization by finding practical solutions to it and, at the same time, to contribute to the scientific environment, was thus accomplished.

The data collection in this research project was qualitative. It included interviews (64), weekly meetings with the IS strategy development steering group, informal discussions and written documents from the federation. The steering group consisted of three researchers and 3-5 members from the federation organization. In addition, there was a small questionnaire about the customers' willingness to use the Internet in communicating with the health centre.

The interviews were divided into two stages (Figure 21) and were completed over three months. An exception was made in the interviews of the board and the management of the City of Paimio and municipality of Sauvo since those interviews were done after the staff's first-stage interviews, when the researchers already had a good idea of the activities, organization and environment of the federation. The interviewees were selected from each division of the organization. The selection was made in relation to the number of staff and the number of workstations, so that the bigger the division and the more workstations there were, the more interviewees were selected. This proved to be problematic since the number of staff was high in the ward but, because of the nature of the work, the number of workstations was low. However, the research group managed to select a good balance of interviewees in that staff with different levels of experience of IS and experience of the organization were interviewed from each division, and the occupational structure of the interviewees was in balance with the structure of the whole organization.

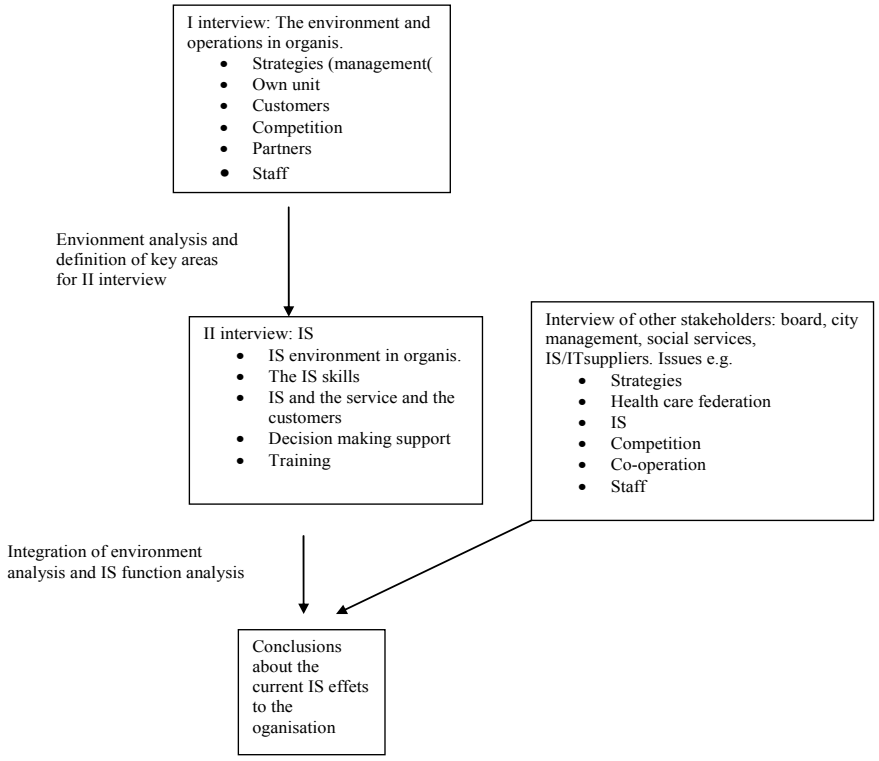

Figure 21 The interview process and themes in the interviews.

In the first stage the aim was to clarify the organization's operating environment and the questions concerned the environment, tasks, problems and future visions of the organization. The basic structure of the interview form was similar for each but the questions about the management and strategy were only asked of the management and clinicians. The topics of the interview were divided into six themes, like strategy, customers and competition, which helped the analysis of the interviews. Each theme included 4-6 questions. Appendices 1 and 2 give two examples of the interview form from interview stage one and interview stage two.

In the second stage the same people were interviewed again, but now the focus was on IS. The topics were divided into five themes on the basis of the first stage: IS suppliers, system use and operating skills, effects on the customers, effects on decision support and IS training. Each theme included 4-9 questions.

The division of the interviews into two stages proved to be effective. The first stage gave a good general idea of the activities of the organization, which enabled a more focused second stage. The interviewees were more relaxed and acquainted with the researcher in the second stage and better understood the goal of the research, so some fine-tuning of the results of the first stage could be done.

The analysis of the interviews was done according to the themes. The same repeating issues were found from each theme. The interviews were written on a computer immediately after the interview and certain themes were highlighted in the text and categorized and gathered in a summary file. The essential information was separated from the total material and was grouped. After all the interviews were finished there were still few more rounds in reading the initial interviews. Basically, the process followed the one in Figure 22.

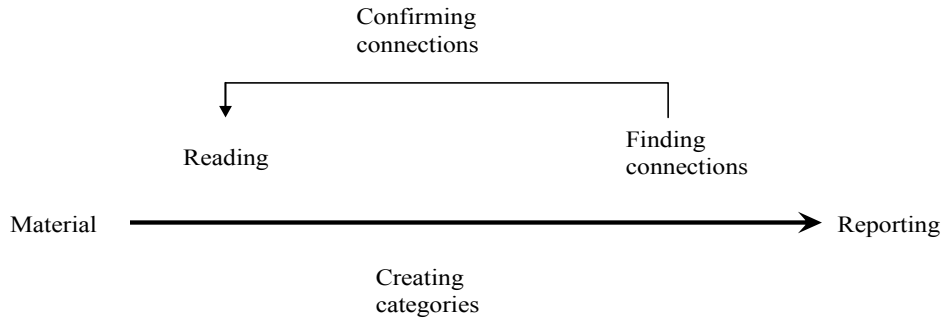

Figure 22 The stages of analysis in case one. Adapted from (Hirsijärvi & Hurme 2000, p. 144).

In the analysis stage the interviewees' answers were divided into groups according to the interviewee's task in the organization. This was already decided

prior to the interviews since one goal was to find out if the opinions between tasks and personnel groups varied. The results were only introduced to the steering groups after all the interviews were done. This ensured that the management of the organization could not influence the staff opinions and the interviews.

Though the number of the interviews was high, the clear division into a few themes made the work easier. The high number also ensured the results of the interviews since when the same phenomenon started to be repeated in several interviews we could be certain that the phenomenon was real. In the qualitative approach this point of repetition of answer is called saturation of material; the data collection can be stopped when the new case does not include any new features or phenomena (Mäkelä 1990). As such, the amount of data is research-dependent – the interviews are needed as much as is necessary from the research point of view (Suoranta & Eskola 1992). The findings from interviews can thus be regarded as reliable.

In the end, the results were shared with the participants (C.f. Berg 2004, 198). There were two presentations organized for health care federation staff in the premises of Paimio health center. In addition, the strategy was presented to the board of the health care federation. To get wider visibility on the strategy, the local newspaper was also invited to presentation. In the presentation the strategy was introduced in a 45 min. session, after which the audience could ask questions and give comments. In general, the goals and results were positively received.

Finally, the IS strategy was introduced to the management of the health centers in the area at a meeting that was held in the premises of Kaarina-Piikkiö main health center. The management of health centers and federations of a similar size and who used the same EPR were invited to the meeting. For the strategy, the most important part was the management of the IS function and the co-operation between organizations in the area. The idea of a joint IS organization was introduced and different organization and co-operation models and methods were discussed. Although the co-operation idea was positively received, it was probably too ambitious at that time and it did not create any further actions on a larger scale.

6.2 The mindset challenge –how to define the roles and tasks in an IS project

In this thesis the mindset challenge of to an IS project in an organization means how different partners and stakeholders can understand the roles, content of environment and tasks of each other. It is not enough to understand just one's own part in the project, one should also understand the environment of other

partners and stakeholders. The problems particularly emerge when the environment of the parties is complex and needs special knowledge, long experience and education to understand the underlying mindset in performing tasks in that area. The IS environment has emerged as a complex environment to understand, sometimes even for the professionals in the area. Thus it is no surprise that those who only use IS as a tool have difficulty in picking up most of the advantages from it.

The health care environment probably presents one of the most complicated and demanding areas that, regardless of the employer's position in the organization, requires highly specialized skills. The comment that was repeated several times during the interviews when asked about the biggest obstacles in the operation development was:

> *"The problem is in attitudes. The suppliers don't consider the needs of the users at all."*

The comment can refer more to a temporary disinterest or hurry on the part of the suppliers or to staff over-reacting in malfunctions than to a straight conflict in mindset. However, it can also be understood that the suppliers do not know the processes in health centres enough to react to at least critical malfunctions in systems.

In Chapter 5.3 there was a discussion about metaphors to assist in understanding the mindset the complex IS implementation process has in the health care processes. Metaphors can be used to make new issues sound more familiar and to compress the information into a more controllable form (Hirsijärvi & Hurme 2000). The idea is not to understand every single word separately but to understand the total meaning or message of the text. The meaning of every single word becomes especially important in areas where the professional language includes words that only people deeply involved in the profession can understand. In such situations the metaphors can offer a way to connect these words to a more familiar environment.

During the implementation of the information systems in Paimio-Sauvo there was lots of confusion and uncertainty in the organization and the atmosphere was not good. At the same time as the IS project there were several ongoing organizational changes, which made the situation even more stressful. Implementation was planned and there was some IS training arranged, but the discussion between management and staff and organization and suppliers was not good. Information was difficult to get, which caused uncertainty.

The discussion with the EPR supplier was especially difficult. The supplier had difficulty in understanding the needs and changes in the EPR. The federation felt that they were alone with their problems. The staff in P-S felt that the

suppliers' knowledge of the health care environment was not very good. It was usual that the important information was received in the unofficial discussions with other users in other organizations. The supplier contacted P-S too seldom to inform them of the new features of the system. Again, the problems were in the communication with the suppliers. The questions about the co-operation were negative:

> *"Not functioning very well. They (suppliers) don't visit very easily. There should be more steering here. Their knowledge of health care is poor."*

> *"Supplier does not inform about updates. You have to chase up new features in an application yourself."*

> *"It is unclear whom to contact (in problem situations)."*

The development of the EPR also got negative comments. It seemed that even from the start the system was not even designed to meet the requirements of health care processes.

> *"Sinuhe (the EPR) is developed to serve the old State subsidy system. It does not serve new follow-up needs."*

The internal organization concerning the IS management was heavily on the federation's manager's shoulders. During his normal management duties he took care of the IS development with no education or special knowledge of the area. Thus, during the busy times the contacts from the staff about problems did not necessarily go to the supplier very quickly. There were main users who were in contact with suppliers but they felt that their knowledge for handling such tasks was inadequate. In addition, there was a doctor who had trained herself in EPR, mostly in her own time, but she was also working in other organizations, so the help was not always available.

The situation in P-S very much resembled the problems and challenges that were discussed in Chapter 5.3. There was no common language with the partners outside and the communication inside the organization was not very well planned. Thus there was a need to improve the roles and the content in the IS development. The situation in the organization was at a stage that although the information systems were implemented with success, the promising start in the use of it had started to slow down.

The superbrain metaphor, where several people or, in this case, organizations were striving for the same goal, could be referred. The problem with the supplier seemed to be a common problem for many small health centers nearby.

However, there was little official co-operation with them concerning the IS area; in the ain, the IS was briefly discussed during some visits around a health issue.

In the developed IS strategy there was an attempt to form a formal strategic co-operation with the health centers in the surrounding areas. The resource-based approach emphasizes the ability to create a network of ties with other organizations. Organizations vary in terms of their potential for discovering and exploiting those ties, and an organization should find its own links between competitive capabilities and external possibilities (McEvily & Zaheer 1999).

The co-operation could have been based on a commonly owned company, which would have managed the shareholders' IS maintenance and charged the market price for the IS services. The organization of the co-operation is presented in Figure 23.

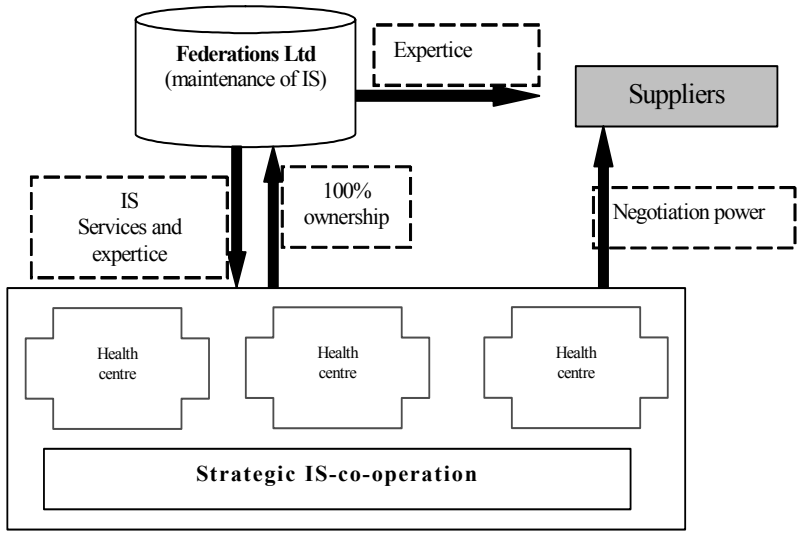

Figure 23 Co-operation model between the health care federation and health centres in the surrounding areas.

With the co-operation the members would have gained more negotiation power with the suppliers and expertise of the joint venture. There was a meeting held with the municipal health care organizations in the surrounding areas and there was interest in such co-operation. The co-operation was considered a good way to improve the effectiveness of IS and, at the same time, the co-operation would have hopefully left more time to concentrate on health care development.

Another metaphor that fits P-S at the internal level was the jazz band. The organization was not working together to improve the systems with the best possible effort. Thus a new organization was created to take care of IS development. The organization's information system was divided into five

entities, which were all pointed towards an "owner". The owner's responsibility was to take care of the development of the entity and the users should primarily the owner of the particular part. The structure of the organization is presented in Figure 24 in Chapter 6.4.

The resources in defining the tasks and roles in an IS project can be studied through the definition of three resource classes by Barney (1991). In that definition he divides the resources into physical capital resources, human capital resources and organization capital resources. The last includes the areas of organization reporting, planning, controlling, coordinating and relations internally, and external resources with other organizations. The problems in the Paimio-Sauvo case were in the area of relations and planning.

It was obvious that in the technical health care IS area, where the development was just beginning, a small organization without enough knowledge could not handle the relationships and development very well. The internal and external co-operation and communication would have to be improved to cope with the challenges. Also, the organization strategy development included issues that could only be executed with more effective use of IS.

Thus the resources that should have been emphasized in order to understand the roles and tasks in the Paimio-Sauvo IS strategy development project were the following:

- The bargaining power in IS development projects, with co-operation between other actors in the area.
- Increasing IS expertise in the organization, considering the size of the organization.
- A clear problem-solving method within the organization and with suppliers.

6.3 The management vision challenge – how to define the areas and goals of the IS project

The management vision challenge in an IS project broadly means how the organization's management can see the strategic opportunities the new system can offer for the organization. The vision is usually concretized in the IS strategy, which should be integrated with the organization's strategic plan. Chapter 5.4 presented the traditional IS strategy planning process the organization's management should go through during certain periods. This chapter focuses on the areas where the management should define the goals and resources of the IS project based on the findings in the P-S information systems strategy project.

The ability to concretize the benefits of the systems from the viewpoint of the federation, City of Paimio and municipality of Sauvo was a central motive for

creating an IS strategy. The management's ability to define the goals of the IS investments become a key resource. This can be regarded as a source of sustained competitive advantage from the viewpoint of the resource-based approach.

In the Paimio-Sauvo IS strategy the most important areas were: IS management, training, internal and external communication, IS architectures, steering of costs and investment strategy.

The emphasis in the first area of the strategy in the P-S IS management was that in addition to supporting the production of key services, the information systems should support the management decision-making in the health care organization and the decision-making in both municipalities. With this information, Paimio and Sauvo could achieve one the goals in the organization strategy - to compare the services and prices of the federation with other service providers. A common answer from the management on the question of information adequacy and accessibility was:

> *"More information is needed for decision making. There is information in the financial administration system but not enough skills to pick it up."*

To realize this goal, IS organization has to be organized so that it is possible to develop it to respond to the requirements for better information quality and information accessibility. The solutions for the IS management areas are discussed in Chapters 6.2 and 6.4.

The second area in the strategy, training to use EPR, was organized before the system was implemented. In general, the training was good and gave a good starting point in using the system. However, additional training was needed since additional needs were realized after the short use. In Sauvo especially, the training was too early and there was a long gap between training and implementation:

> *"More training in the use of the system since it would be more useful now (after one year's use). The issues should be looked through again."*

There were a few quite alarming comments about the usability of the system, which could have been caused by the too early training or increased and expectations towards the system:

> *"IS has changed the work of the nurse a lot. IS takes more time now than the papers did before."*

The focus of the training bound to the position was also emphasized. The training needs were divergent and the principle of "all training for everybody" was criticized. When the training is clearly focused on one's own task, the motivation to learn is better.

The next area was internal and external communication and information sharing through intranet and Internet, which was seen as essential since it affected the image of the organization. The internal communication had previously been managed with manual notes and information booklets. External communication through Internet had not played a big part in the communication with customers; only some basic issues like office hours and telephone numbers were available through the health centres' or municipalities' home pages. There was no clear strategy on how the communication and information sharing should be taken care of and how the Internet would be used in the future. Thus a strategy should have been created and the increased role of electronic communication should have been encouraged.

The architecture definitions were not done in the federation. Thus there was no clear picture of what the systems included, what connections there were between applications and how much overlapping information and double storages there was. All the information could be found, but only after some research; it was not in one single place or possessed by somebody but had to be gathered from a number of employees.

The application, information, hardware and telecommunications architecture were designed in the IS strategy. The information and application hardware was quite complicated since there were thirteen different applications in which some information was saved in two or three places. The key to the whole IS was the EPR, and the aim was to gather all the data from other applications under it. This was not only in the hands of the federation but was also dependent on the application development by the supplier. It was not possible to convert all the data from other applications to EPR.

The next area in which the goals should be defined is the planning of steering costs in an IS project and, especially, after the project. The problem in many public sector organizations is that the productization of the processes is only in the early stages. Therefore, following the actual costs of any process or function is difficult. This also concerns the IS processes, where the cost of use is even more difficult to divide since it is not an organization's core area and there is not enough expertise to identify the parts of the IS process. Dividing the costs evenly between each unit is easy, but does not bring out the actual costs of use. On the other hand, building the appropriate measures to dig out the actual costs is challenging.

Finding the operating costs of IS in P-S proved to be difficult. For example, the IS training costs were allocated under the general training costs and did not

offer information on the IS costs. Other IS operating costs were allocated either to different units or under the administration. Some of the applications were acquired together with the City of Paimio and the municipality of Sauvo, which made the cost following even more difficult. The definition of the new IS organization offered a way to distribute the parts of IS to entities that were easier to administrate when each of the system parts had a responsible owner who was also in charge of the development costs.

The last area that was defined was the planning of the investment strategy. The investment strategy is dependent on the focus areas in the organization's strategy. Since it is normally impossible to invest in all the required parts of a system, the needs have to be prioritized. In the current situation, health care organizations are increasingly using strategic planning and the long-term goals have to be clear. In Nurmi's (Nurmi 2000) definition the organization can put forward either the customer and employers or the owners and stakeholders. Although health care organizations have to consider both, the first one, which emphasizes the strong financial structure, is probably the dominating view.

In P-S the high priorities were issues like improving the content of the economic information for use internally and by the federation owners. Another goal was to develop a process organization emphasizing the service chain from social services to special health care that was visible to customers. The main goal in both was to improve the quality and impressiveness of the care. The goals set high requirements on the IS development. To be able to realize these requirements, management IS, EPR and telecommunications should be improved.

To help to define the goals of IS and IS projects in P-S there a list of focus areas was defined. It emphasizes, but not prioritizes, the areas that should be paid attention to in the future. Although the items originated from the P-S IS strategy development process, they can be attached to almost any health care organization in defining the focus of an IS project, and can be considered general guidelines. The list also emphasizes the areas where the management resources should be focused:

1. IS should support the decision making by staff in their tasks, with up-to-date and easily accessible information on the customer.
2. In the first place the system should support the care, its efficiency and its impressiveness, and ensure fluid communication between the staff and the customer about the customer's health care information.
3. IS should promote the development of a seamless care chain between social services and primary and special health care.
4. IS should produce strict and up-to-date information for the use of management so that it can make strategic and operative decisions that are based on the federation's actual situation.

5. The system should produce strict and up-to-date information for the use of the municipalities so that they can evaluate the content and the costs of the service they buy.
6. With the improved internal and external communication, IS should help to cut down the overlapping and manual functions.
7. In defining the IS architectures the goal should be a coherent and compatible entity to improve the maintenance and functionality.
8. The information security of the patient information should be guaranteed so that it is only available to those staff whose decision making it affects.
9. The user training should be at the same level as the system development to ensure the most effective use of it.
10. The system of IS support should be built such that it is not dependent on a certain person but is bound to a certain task.

How an organization can allocate resources to each area, and how it prioritizes them, much depends on the organization's competencies and capabilities. The strategy making is after all, a priorization of several alternatives considering internal and external threats and opportunities.

6.4 The governance structure challenge - defining the right form and control of the IS function

The governance structure challenge is manifold and broadly defines how an organization plans and controls its IS functions. The governance structure includes more than just management of the IS. The governance structure needs management but it also appears in management. The governance structure issues and tools for analyzing governance structures are discussed in Chapter 5.5.

The starting point in P-S was that the governance structure to steer IS functions were not clear. Therefore, one of the main goals was to develop the structure by creating a strategy for the management of IS. The development needs were mostly intra-organizational. Figure 24 presents the new scheme for managing the IS function in the organization.

Although there were problems in the inter-organizational relationships, e.g. in the connections to the municipalities and the system vendors, the problems in those relationships were often due to a lack of clear internal organization to handle them - the rules and roles of acquiring new components for the system were unclear and the question of what is the most crucial thing in IS acquisition was answered as:

> *"You have to have a clear vision of what is needed, a plan for a few years. Somebody who can assess what is needed."*

> *"The buyer has to know what it needs."*

One of the first tasks was to solve the problem of responsibilities for different components of the system. The lack of responsibilities emerged in the interviews:

> *"Something is missing. There should be one and only one person responsible for different parts (application and technical), who would react to problems."*

> *"Clear system, how to operate in problem situations also written down."*

Each system component should be allocated to an owner. Earlier, the manager of the federation had that task almost totally himself, but since the systems had started to grow and become difficult to handle it was decided that each component of the system should have their own owner. Owners were selected from the management of the organization and they adopted total responsibility over their management areas. The main users who were links to the practice in different departments supported them. The main users were selected from the staff on the basis of their position and IS knowledge and interest. The structure was primarily defined to clarify the organization of IS management, but since IS is the heart of the value chain, the work naturally served the management of the organization's value chain as well. With clear responsibilities, the problems are identified and solved more quickly than in a situation where it is not clear whom to contact. In an information-intensive industry like health care the fluent information chain can be called "dead serious".

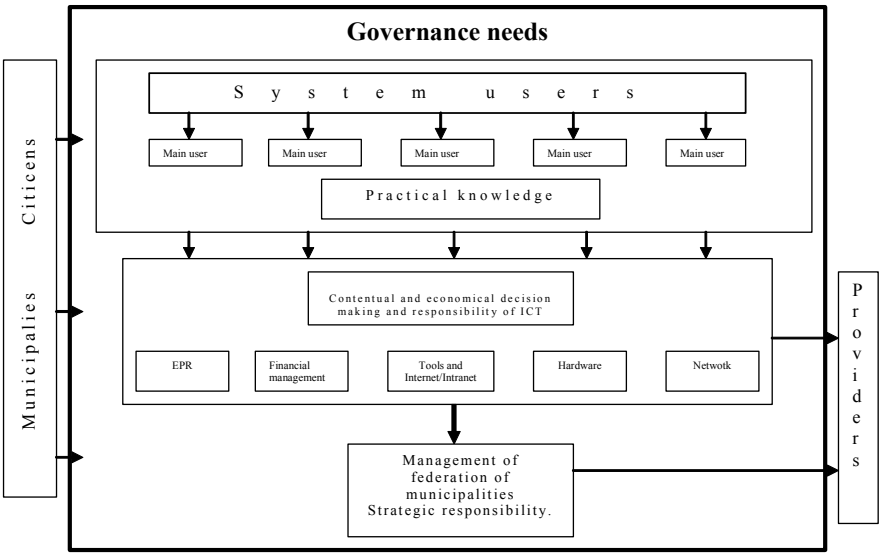

Figure 24 The new governance structure in P-S.

With defined responsibilities the organization had a clearer structure with which to manage IS, which is crucial in any governance structure attempting to economize the exchange relationships. A structure should be lasting, so in the model the ownership is not bound to a person but to a position. The people may change but the position is most likely going to remain. The person may also change to a position where the task of owner would be difficult to execute. With a clear structure of system owners the information also flows to the management more efficiently. Achieving a lasting structure gave possibilities to define rules to manage it – a stable structure supports our main goal of setting up a decent information management strategy.

Exchange relationships with external stakeholders also became clearer. The organization now had a structure with rules, with which it could handle relationships in a more focused way. The relationships with system vendors, which were haphazard, became clearer. There was now a defined contact person for each part of the system and the contacts could be conducted through them. The structure also represents the guidance functions mentioned earlier in our definition of governance structure.

The P-S case pointed out that even, or better yet, especially, a small organization needs clear governance structures to handle various functions. From the transaction costs point of view, health care is moving from a hierarchy where market transactions are eliminated towards a market. This change has been fast and health care organizations have faced difficulties in adopting the new ways of operating. The industry has not had enough time to adjust to the new situation and organizations have tried to cope with old structures. The governance

structures should be emphasized, especially in the case of functions with a high effect on processes and activities but with little expertise to handle them in the organization. IS is not a core business in any health care organization but affects almost every process and activity when implemented.

In the P-S case the governance structure solution was insourcing. In the case of outsourcing the solution and required resources would have been slightly different. So the resource areas that were emphasized in creating governance structures and processes in the IS project in Paimio-Sauvo were:

- A clear structure of the internal IS organization, with defined responsibilities and visibility to staff.
- The structure should also be visible to the suppliers.
- The information flow from users to the suppliers.
- The stability of the IS organization.

6.5 The resources allocation challenge – the competition for resources in public health care

The resource allocation challenge includes the complexity between the number of investments and the scarce economic resources. In addition to the number of investment targets, the complexity is increased by the number of stakeholders with public decision-making political motivations. Each has their own strong and, in their own opinion, well argued justification that their suggestion for investment should be realized. The issue of stakeholders, their expectations and interest in investments is discussed in Chapter 5.6.

The main stakeholders in P-S are much the same as in any small or large Finnish city. The municipal administration has to fulfill certain administrative regulations and obey rules, and the bureaucracy and decision making is as complex as elsewhere, despite the small size. The main stakeholders are medical staff, patients, hospital management, professional staff and boards and trustees. In addition to that, since there is a federation of municipalities, both partners in that federation have to consider the needs of the other. In the case of IS investments, as any other large investment, the role and opinions of the management and boards and trustees as a stakeholder who make the final decision on resource allocation become crucial. These stakeholder groups make their decisions based on their own opinions, which should be based on the opinions of other stakeholders and also based on the plans and goals of the organization.

The resource use in the P-S federation is defined in the organization's critical success factors. There the main areas are the definition of and understanding the customers' (patient customer and the municipality customer) needs, the economy

of the operations, the effectiveness and impressiveness of the operations and the development of the organization. Although none of the areas include any concrete investment targets, it gives some guidelines on where to focus the resources. The management responsibility is to decide which resources the goals are reached with.

Though the investments in IS often raise discussion and arguments, in P-S the investments in information systems were viewed quite positively by the political decision makers. The answers to the question about the importance and need for IS in the federation supported the long term development of the system.

> *"It's good when the information flows fluently – no overlaps. Now also the attitudes of personnel are improved."*

> *"Now when they (IS) are acquired, they have to be kept functioning. If something breaks, it has to be repaired."*

The investments were seen more as a necessity to improve the health services than as a questionable or false investment. It was also important that the health care board of the federation supported the completion and update of the system. Thus there seemed not to be risk that the system development would remain halfway because of a lack of money.

> *"It has to be developed all the way."*

> *"Crucial (IS). It has to be kept updated."*

Thus the struggle for scarce economic resources regarding IS investment in the P-S federation was not very strong. This was probably mostly due to a careful business strategy, where the development of the health center and the role of IS in that goal was argued well. However, as the fear of increased competition between private and public sector health care was not seen as being realized in the near future, the need for the public side to raise its profile was seen as important.

Even though the IS investment decision process and implementation of the new IS seems to have gone well in P-S, there were some issues that should have had better focus. The areas where the management should focus when justifying the allocation of resources to different stakeholders are:

- The definition of the goals of the IS project to boards and trustees and staff.
- The definition of the benefits and the evaluation of the benefits of IS to all stakeholders based on their position in the organization.

6.6 Summary of the findings in the Paimio-Sauvo case

In general, the decision-making process and the implementation of the new IS in the P-S health care federation of municipalities went satisfactorily. Although it was not the best moment for the implementation because of several other changes in the organization, it could be said that IS also forced the organization to change its organizational structure to be more clear and visible. Thus IS acted as a motivator for the change to the management. However, some problems emerged in developing the system further and the organization did not have the resources for such IS planning.

The solution to several problems in communication (mindset problems) with the system vendor was to develop stronger co-operation with other users. Such co-operation could be loose with, e.g., official meetings every now and then or a separate, jointly owned organization whose sole task would be to maintain the IS of the joint organizations. The latter case was suggested to P-S. The aim was that the joint organization would understand both the IS and the health care industry, and thus the communication would improve. The second benefit would be better bargaining power with the system vendor, but the joint organization solution remained in the planning stage in P-S and surrounding health care organizations.

In the industries where the use of IS has been rather small the management skills to define the goals of an IS project and further development is difficult. However, especially in such situations, the definition work is essential. In P-S there was a need to identify strategic IS areas where the management should focus in the next five years to develop the new system to better respond to the organization's needs. The areas which were emphasized in the P-S IS strategy project were: definition of present and future architectures solutions of information, software, hardware and network; IS cost steering; training and IS investment strategy. The aim was to make the central areas clearer for the whole organization.

The area of IS governance structure in P-S was not very clear. The problem-solving methods and chains were blurry both within the organization and with the system vendors. There was a need for clearer organization where responsibilities to manage the IS development were divided into clear areas. An organization of system owners was developed so that a certain position in the organization would include the management of a certain area of IS. This included both communication with system vendors and users. In this way the communication and flow of information should be clear for both sides.

The last area discussed in the P-S case was the resource allocation. In the P-S case the allocation of resources to IS seemed not to cause any major confusion, problems or resistance. However, in the management of the municipalities and board of trustees it was noticed that after the initial investment in IS, its

development had to be supported or it would unfold into an area that would slow down the development in the federation.

7 EVALUATION OF INFORMATION SYSTEMS IMPLEMENTATION PROJECT IN THE HEALTH CARE DEPARTMENT OF THE CITY OF TURKU

In this chapter the empirical findings of the evaluation of the Primus project in the City of Turku are presented. The chapter is divided so that the case organization and the research project are described first, followed by the data collection. After that, the cases are discussed on the basis of the framework presented in Chapter 0. The main functions and problems related to each management area are presented and then resources that are needed in the organization to improve its IS management are discussed. The chapter points out the IS management areas the cases highlighted - areas on which organizations in the public health care sector should concentrate in their IS implementation and development projects.

7.1 The case in detail

7.1.1 The background to the city's information systems development project

The City of Turku is the fifth largest city in Finland, with about 170,000 inhabitants. The population has grown steadily and the growth is expected to remain steady in the future. However, a significant share of the population growth consists of elderly people, which sets pressures on the city's social and health care departments. Of the city's total budget, the share of health care is one quarter and even small changes in health care costs have caused considerable changes in the total budget. Additional problems in the city are growing drug use and increased mental problems.

> *"Turku is already a city of old people and people move here when they retire. If not before, at the latest when they retire."*

In 1997-1998 the health care department made two far-reaching and important decisions. The first was to move to a system where each citizen was allocated their own personal doctor, which practically meant that each doctor had responsibility for a certain number of citizens in a defined area; previously, the customer was appointed to a doctor almost randomly.

The second was to acquire a new extensive information system for basic health care, including a new information network for the whole department. Health care moved from a manual system to a modern electronic system. Only financial administration had used information systems before, so the challenge can be regarded as somewhat considerable. The plans to move to the new system originated from the 1980s, so the change could be considered well considered.

In 1998 an information systems development project called Primus was launched in the City of Turku health care department. However, the project was not only considered an IS project but a more wide-ranging development project, where different parties in the department, the city, and the citizens and their needs and strategies, were considered.

The project was based on the strategy of the health care department and the information management strategy. The latter was updated at the same time as the Primus project was started.

The main partners to the health care department in the project were Sonera and NovoGroup. Sonera is a teleoperator and NovoGroup the provider of the new patient record system. Sonera has since merged with the Swedish Telia and is known now as TeliaSonera.

Sonera held the main responsibility in the project and acted as a so-called system integrator. The partnership was based on an outsourcing solution where Sonera delivered and maintained the main infrastructure for the department, and maintained the servers and applications supplied by NovoGroup in its own premises. Sonera was selected as an outsourcing partner and system integrator after competitive bidding. The competitive bidding itself had already caused a lot of discussion and arguments since Sonera (previously Telecom Finland Oy) was chosen and the city's own teleoperator, Turun Puhelin, was overlooked. At the time the selection was made there were no official guidelines on how to organize competitive bidding and the main argument was that there was no actual and formal competitive bidding. However, the arguments varied from side to side.

> *"The project was not under competitive bidding."*

> *"The project was strongly under competitive bidding in Turku. The local operator (Turun Puhelin) was the main competitor then."*

"It was not possible to put the project under competitive bidding, the development part was unique and the information network…"

The software deliverer, NovoGroup (previously Siemens Nixdorf), was chosen after a comprehensive competitive bidding. The health care department tested several ready-made softwares with an extensive test program and the test project was also written in report form.

The ultimate goal of Primus was to modernize the city's health care information systems, including the backbone network, innovative process changes and outsourcing of operational functions. The project started in 1998 and ended at the end of 2002, and was divided into four subprojects:

- electronic patient record (EPR)
- information network
- process development
- minor development projects.

During the project, 800 users at 440 workstations began to use the new EPR in about one hundred different units around the city's health care department. The total investment in the project was around 9,000,000 €.

Primus was a pioneering project in many ways. Turku was one of the first larger cities in Finland to implement the EPR on a larger scale. Cities like Helsinki started their project years after Turku, so the experience was new, not only to the department but also to the system supplier and others involved in the project. For Sonera, the project was unique since no other teleoperator in Finland had acted as a total supplier of an extensive information network based on the newest technology. The infrastructure, services and other solutions were based on several of Sonera's existing services, but Primus was a versatile pilot environment in which to develop and test totally new solutions for the use of health care.

To summarize the background and the starting points, it could be concluded that the good side was definitely that the Primus project group was well motivated to manage the whole project until the end. The realization of the different stages in the project were well argued and the co-operation inside the project organization was good. Another issue that helped the project was that the system integrator, Sonera, was also well engaged with the project since it was a new area for them - and one in which they wanted to expand - and they had to show that they were capable of handling such a project.

The downside was the quarrelsome group of stakeholders who were not convinced of the need for the project or at least its scope. Although the management of the department and the City seemed to be positive towards the project, there was a group that did not see the project as the most important

investment target in health care. This especially threatened the financing of the further development of the system, like the minor development projects in the total project or widening the project to other areas of the city's health care. In this case, the total benefits of the system wouldn't have been achieved. The size and uniqueness of the project can be regarded as another downside. There was no possibility of comparing or acquiring information and experiences of other such projects. Thus the starting point was very difficult and took quite a long time to realize as an implementation stage.

7.1.2 The process of the evaluation research

The implementation of new information systems and the infrastructure connected to it caused a lot of changes and new challenges in the city's health care department. The starting point in the Primus project was to first build the basic systems - namely the information network - as a reliable and comprehensive backbone. After that, the EPR and latest versions of supportive applications to strengthen the base of the services were implemented.

After the basic systems were successfully implemented the department started to develop the main area - the care and service processes - as a high-quality, customer-friendly and cost-effective environment. Even though the department and the project group had done their own evaluations, they also wanted to have an external view of the development project. An external evaluator usually sees parts of the phenomenon in a different light and usually finds new perspectives for evaluation. The aim of inviting an external evaluation group was to ensure that the investments were targeted and used effectively, and to avoid errors in future development.

Thus the initiative for evaluation came from the Turku health care department and Sonera, who ordered research on the planning and implementation, the appropriateness of the processes and the overall economy of the Primus project. The fact that the orderers of the research were from the organizations whose activities and success the research group should evaluate was a little odd. It would have been better if the orderer had been the City or health care board. However, the research group felt that the co-operation with the partners was conducted in good spirit and even the most difficult issues were able to be discussed. In a way, the research group was acting more as a development partner according the ideals of action research than as external and prejudiced auditors. This concept was also supported by the fact that several changes were proposed during the evaluation, some of which were already under development. So the material was analyzed, an interpretation made and information shared

(C.f. Berg 2004, 197-198) during the research and the research produced action within the organization.

At the time the evaluation research was conducted, the Primus project had been underway for about eighteen months. The project had started in the autumn of 1998 and was planned to be ready by the end of 2002. Thus part of the system was already implemented in the departments and part of it was still under implementation. This gave the research group an opportunity to evaluate the system at different stages and the possibility to interact with the implementation of the rest of the system.

Initially, the timetable to conduct the evaluation was one year. However, during the research it appeared that there were a number of issues that had to be considered and included in the initial evaluation frame, thus the timetable was exceeded. The first part of the evaluation took place between 1.1.2000 and 30.6.2000, and the final report was ready in August 2000. The second part of the evaluation was conducted between 1.1.2000 and 30.12.2000 and the final report was ready in March 2001.

The research project steering group was established after the agreement was signed. It included members from the health care department, the Primus project group, Sonera and the Turku School of Economics and Business Administration.

- Turku health care department
  - Ilmo Parvinen, manager of the department (in the first part of the research until autumn 2000)
  - Eero Vaissi, temporary manager of the department (in the second part of the research from autumn 2000)
  - Virpi Pyykkö, Primus project group leader.
- Sonera
  - Marjatta Kuitunen, department manager
  - Petteri Laitala, area manager in Turku.
- Turku School of Economics and Business Administration
  - Reima Suomi, professor, research manager.

The researchers in the evaluation were Jarmo Tähkäpää as a senior researcher and Johanna Holm as a researcher (in the first part of the research). Both researchers were present in each of the meetings of the steering group.

The meetings were held once a month throughout the research and occasionally people from outside the organization were invited in the meeting in the case of some special issue. Since Primus as a project was proceeding all the time during the research, the meetings were essential in order to hear the latest advancements and to fine-tune the evaluation. Despite the number of meetings, the research was sometimes like shooting at a moving target – when the research group had discovered some essential improvement of problem, it was already

noticed and handled. On the other hand, this confirmed that the direction of the research and recommendations was correct.

The evaluation was divided into two parts, which overlapped in some places. The main purpose of the evaluation was to study whether the entire information systems project was well argued and whether the solutions developed and implemented during the project were being effectively managed, or would the same results have been accomplished with different methods.

In the first part of the evaluation the process, responsibilities and decisions that led to the selection of partners and certain solutions and implementation of IS were evaluated.

This included issues like:

- negotiations
- sourcing and co-operation decisions
- strategic positioning
- resources used
- management of the project
- rationality of economic investments
- contractual relations
- supportive issues (training)
- technical solutions.

The focus of the second part of the research was on the effects of the Primus project for different stakeholders. The second part included issues like:

- the effects of the project on the health department
- total costs
- end user satisfaction
- patient satisfaction.

Several proposals were suggested to the Primus project group, the health department and the City of Turku after both parts of the research. The results of the research were presented in two reports published in the city's publication series (Holm, Tähkäpää & Suomi 2000; Tähkäpää, Suomi & Holm 2001). The reports were distributed to a wide professional and scientific audience to get feedback and comments. In addition, the researchers were interviewed on local radio, which emphasized the importance of the Primus project to the city, and several articles were published in national health care professional periodicals.

After both parts the researchers presented the results in a 2-3 hour seminar. The shareholders whom the Primus project touched in some way and, especially, those who were interviewed during the research were invited to the seminar (C.f. Berg 2004, 197-198). Naturally, people were invited from different levels of the health care department and city management, and suppliers and national organizations like the Finnish Medical Association.

The results received various comments. In general, the comments were positive, but there was a group of people who opposed the project in its current scope. They would have expected more critical conclusions about the Primus project. However, the research group felt that the evaluation was done with satisfactory width and depth. Of course, by lengthening the evaluation time and increasing the research group, more information could be have been found, but in order to answer the initial research task it would not have brought any additional value.

7.1.3 The data collection

The research methodology in the Turku case was action research. The main motivation of the department to evaluate the Primus project was to demonstrate and ensure the importance of the Primus project for the development of health care in the city, since the opposition to such large and expensive project was strong. The second goal was to find the factors that needed improvements and to learn from the evaluation for further projects. However, Primus was just the first (though large) stage in further implementation of the IS, including basic health care. The results had an effect on the department and the project because the evaluation started in the middle of the project. It was still possible to affect to it by finding practical solutions to improve the impact of IS on the organization.

The data collected, in addition to extensive qualitative data, also included quantitative data. The data collection methods and target groups were:

- interviews (about 40)
  - project management
  - management of the health care department
  - clinicians, nurses, other staff
  - management of the city
  - suppliers
  - management from professional and government organizations
    - Finnish Medical Association
    - Ministry of Social Affairs and Health
    - Association of Finnish Local and Regional Authorities
    - National Research and Development Centre for Welfare and Health
  - other health care professionals.
- questionnaires
  - staff (350)
  - customers (600)

- steering group meetings (monthly)
- group interviews (2)
- evaluation seminar (half day)
- written material from city, professional material (periodicals) and journals.

By using multiple data sources it is possible to ensure that all the aspects of the phenomenon under study will be considered. It also diminishes the possibility that the research will be emphasized in an undesirable or too limited and simplified direction (Patton 1990).

This so-called triangulation of methods ensures the rich picture of the phenomenon under study. Jick (1979) describes his study in the following way: *We try to collect a rich picture from the organization and phenomenon under study and collect data using both qualitative and quantitative methods according to principles of triangulation.* (Jick 1979). This describes our research project very well.

In this research we could speak about researcher triangulation since the researchers were in close interaction during the study and it was possible to share opinions and interpret the results. The internal reliability of the interviews was increased so that there were always (with a few exceptions) at least two researchers present who made their own notes. Some interviews were also recorded. The interviews were then rewritten into a file and evaluated by other researchers. This ensured that all the relevant aspects of the research were considered.

The focus and the scope of the data collection were beginning to become clear after the initial meetings. It became obvious that the goals of the research needed more extensive data gathering than just inside the organization. For example, the strategic dimension in the research led to a need to study the national view of the development of the health care industry.

The main data collection method was interviews. The questions between different interviewees followed the same themes, but since the group of interviewees was wide there was a need to adjust the questions according to the interviewees' backgrounds and, of course, according to the goal of the research. The management of the national organization had different questions to the help desk personnel in the health care department. In Appendix 1 there is a division of the interviews into different themes according to the interviewees. In Appendix 2 are two examples of the interview questions – the first was for the city management and the second for the management of the health care department.

All the interviews were done in the interviewee's workplace so that the interview situation would be as natural as possible. A situation in which the interviewee does not feel comfortable might cause some bias in the results, and thus to the reliability (McKinnon 1988). To help to follow the progress of the

interview, the interviewee was given the questions so she/he didn't have to try to remember the question but it was possible to check it at a glance. This helps, especially in a situation, where the interviewee is nervous and can't concentrate on the questions the interviewers are asking. The interviews lasted from 40 minutes to one-and-a-half hours.

The interviews were analyzed by the two researchers and commented on by the research manager, who often attended the interviews as well. The answers were typed up immediately after the interviews so that the researchers would remember all the non-verbal messages during the interviews. On the whole, the interviews followed the process in the first case, which can be seen in Figure 22.

Saturation was clearly accomplished in the interviews. This was even expected since the number of interviews was high and the selection of appropriate groups of interviewees was done very carefully. Each group included several representatives and not just one, which would have most likely caused bias in the results.

However, even the research group was quite satisfied with the results of the interviews, and it decided to use two additional methods. Two group interviews were conducted and a seminar session was organized where each stakeholder had a possibility to bring out her/his own and her/his organization's opinions on different aspects of the Primus project and research.

The evaluation seminar was held after most of the individual interviews were done. The program for the seminar session was such that each of the most important stakeholders (9) were invited to present their thoughts on how the Primus project was conducted, what the role of their organization was in it and how they had succeeded in their task. Each presentation lasted from 20 minutes to half an hour. After the presentation there was time for panel discussion.

The panel discussion was even more fruitful than the presentations, since it brought up the problems and arguments that were raised in the individual interviews. In the panel discussion the participants had a chance to explain and defend their opinions against the accusations and complaints. However, even though the discussion was quite lively every now and then, the discussion ended in good spirits.

The group interviews were held at the end of the research and the researchers were able to select certain central themes for the discussion. The first group included management-level stakeholders in the Primus project from different organizations. They included the deputy city manager, the chair of the board of health care, the deputy head of the social department, the department manager from Sonera and a general medical doctor from Turku university hospital. The group was selected on the basis that each of them were either responsible for the decisions made in the city concerning health care (thus including the Primus

project) or their organization and health care department was in close co-operation.

The second group included staff from the Primus project and staff from the health department as users of the new system. There were two project managers from the Primus project, the main user of EPR, two head nurses and two doctors from the health centre. The last two groups also acted as main users along with their normal work. The aim of this group was to throw together people who were planning and developing the systems, and people who used and acted as main users of the system.

The interviews were occasions where the interviewees mainly discussed the themes the researchers gave them. The feature of the method is that the researchers are mainly following and, when needed, changing the scope of the discussion. Both interviews lasted about two hours and some new items arose, which could not have arisen in the individual interviews.

After most of the interviews were done the research group decided to gather information in a quantitative way as well. The interviews were done with main and key users, who no doubt had the best and widest knowledge of the problems the users were facing since they solved those problems daily between the suppliers and the users. Although those interviews gave a good understanding of the process and effects of the implementation on system users, the quantitative data strengthened the results. The questions in the survey consisted of six themes and the total number of questions was 51; the answers were graded on the 1-5 Likert scale. The main themes were:

- the information flow in the Primus project
- the implementation stage of the EPR
- user support
- the effects of the system and project on work
- daily information flow (in work)
- the necessity for the Primus project.

Before the themes there were background questions about the users' profession, experience of the EPR and computers. After the themes there was space for open comments. The questionnaire was sent to 350 end users within the Primus project and 208 replied.

The second survey was made for the customers of the city's health care. Since the interviews were measuring the internal effects of the system implementation, the department also wanted to have the customers' views as there had been a lot of debate about the need for the system and alternative investment targets. The questionnaire for the customers was also on the 1-5 Likert scale and the number of questions was 44; there was also space for open comments at the end of the customer questionnaire. The themes of the questionnaire were:

- the knowledge of the Primus project

- the process of making an appointment with a doctor
- the easiness of visiting the health center
- the estimated benefits and disadvantages of the system for the staff from the customer's point of view
- the effects of the system for customer
- the willingness to use the Internet in communication with the health care centre.

There were some background questions at the beginning of this questionnaire to map the causes of visits to the health centre and some information about education and density of visits to the health centre.

The questionnaires were left at four health centres and the staff were asked to give them to each customer until they were all finished. This took about 3-5 days. Altogether, 600 questionnaires were given out and 309 were returned, of which 226 were accepted.

Figure 25 shows the data collection, which mainly comprised three methods.

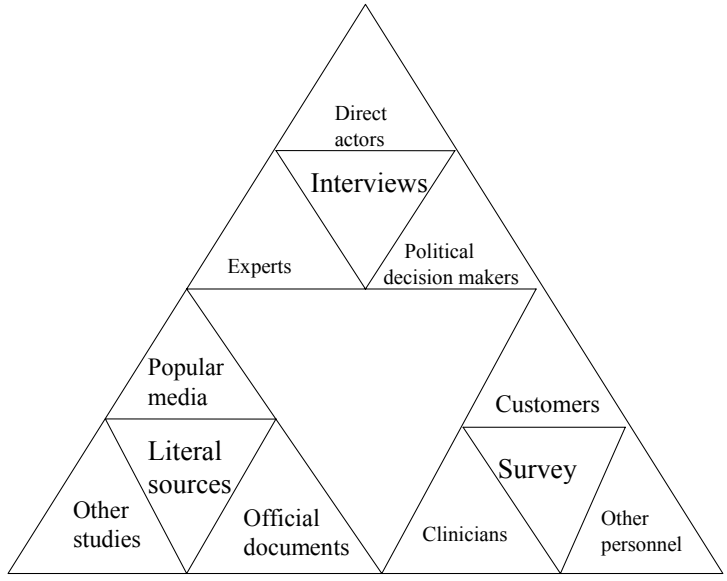

Figure 25 Data collection in the Primus project research.

The Figure highlights two of the four triangulation types - method and data triangulation. The researcher triangulation was already discussed earlier and the fourth is a theory triangulation. The main purpose of triangulation is not just to combine several methods or data but to eliminate the threats to the validity of the

research (Berg 2004, 5). For example, ethnographers often use triangulation in addition to observation in interviews with key informants to strengthen the validity of the research (Silverman 2000, 48) Three methods were used such in a way that most of the results were found with more than just one method so that the result could be regarded as valid. Saturation of the material also occurred, which, in turn, helped the researchers to make conclusions about the adequacy and appropriateness of the material.

7.2 The mindset challenge – how to define the roles and contents of an IS project

The mindset challenge in an IS project in an organization means how the different partners and stakeholders can understand the roles, content and tasks. It is not enough to understand one's own part in the project; one must also understand the environment of the other partners and stakeholders. Problems emerge when the environment of the parties is complex and needs special knowledge, long experience and education in order to understand the underlying mindset in performing tasks in that area.

In Chapter 5.3 there was a discussion about metaphors to assist in understanding the mindset the complex IS implementation process has in the health care processes. Metaphors can be used to make new issues sound more familiar and to compress the information into a more controllable form (Hirsijärvi & Hurme 2000). The different problems in understanding the mindset of the parties in the Primus project are discussed in this chapter.

There were two main entities in the Primus project in which the parties' mindset of would have needed some special attention and methods to clarify the effects and consequences. Those were the negotiations about outsourcing solutions and contractual agreements.

The negotiations at the time of the competitive bidding were long and had different phases. The main problem was that there was no coherent agreement about whether the outsourcing solution was really under competitive bidding or what the department was actually acquiring. There were two reasons for this. First, at that time the city did not have any unambiguous rules on how to conduct competitive bidding, and second, the IS project was very large, which meant that it was difficult to understand what the health care department was actually asking for or should ask for in the tender. The next comment from an interviewee is good example of the problem in understanding the bidding process.

> *"the competitive bidding was out of the question, there was this development part and then this network part – the competitive bidding*

> *would have been difficult in that situation of that what includes what. In the agreement it is said that the prices must be competitive, so comparison was made during the agreement, the prices were compared with competitors many times. Though there was no official competitive bidding, there surely was comparisons done and different solutions sought in particular cases of the prices of the network."*

The problem was mainly caused because it was difficult to find a partner in Finland who would have been able to offer such an extensive solution as Sonera was offering. On the other hand, Sonera was not interested in offering smaller parts of the IS project. In a way, Sonera's offer was unique in its size and content, and it was difficult to compare any other offer.

> *"In 1997 there was a strong argument about the contracts. According to some arguments, Sonera's prices were not competitive. However, the conclusion was that the prices were not comparable."*

The size and the complexity created a problem in different stages of the organization in the health care department. The process, from starting the negotiations to the agreement, took over a year. There were opinions from different sources that the process was too long and that the municipal decision-making process delayed the process several times without creating any additional value. The reason for this was that the parties in the decision-making process were unsure of the content of the project.

> *"Formally, the decision-making process was correct, but, at the same time, comes up the shoddiness of the municipal decision making in the way that we as laymen have to make decisions that we don't believe in our hearts."*

The eventual agreement included quite extensive outsourcing. At that time the solution was exceptional in the Finnish public health care sector. Although some of the partners involved considered the solution more of a deep customer-supplier relationship, it followed the concept of outsourcing.

The main problems in the negotiation and contractual agreement were in understanding what the outsourcing included and meant for the city's health care. Another was the responsibilities the partners had in outsourcing. The concepts of IS and the technology itself were difficult to plant in the health care environment so that the staff and decision makers would have had a clear concept of the system.

It seems that the negotiation stage in the Primus project would have needed some additional ways to clarify the contents of the intended solution, as discussed in Chapter 5.3. It can be regarded as a situation where there was little or no previous experience.

Of the metaphors presented in Chapter 5.3, at least those that cover issues of B2B market places, strategic alliances and syndicates that focus on the complexity of external interactions could have offered clarification of the organizational complexity in the Primus case.

The most important resource area in the Primus case was the ability to organize a competitive bidding. The comparison of prices and content of a large IS project is a challenging task, even for an experienced organization. As the first such large IS project in the City of Turku, the Primus project was a real challenge. The resources in such a project are too concentrated on knowledge of the legislative and technical areas and the ability to see the processes through the organization.

As mentioned in our report to the city, it managed surprisingly well in the task. This was probably due to the careful preparation for the project and a dedicated project group. This is a second resource in such an IS project that should be emphasized. Despite the problems with the competitive bidding, it had prepared certain meters with which it could compare the offers. The content of the required system in the competitive bidding was quite well reasoned.

The third resource that unfolded in the project was the co-operation between the network supplier Sonera and the health care department. Sonera was starting to operate in the health care sector and thus had to first get to know the industry, and second, had to show its prowess in the industry in order to get more customers. The co-operation could be said to be strategic and supported both organizations' long-term goals.

7.3 The management vision challenge – how to define the areas and goals of the IS project

The management vision challenge in an IS project broadly means how the management of the organization can see the opportunities the new system can offer for the whole organization. The vision usually becomes concrete in the IS strategy, which should be integrated with the organization's strategic plan. Chapter 5.4 presented a traditional IS strategy planning process, which the organization's management should go through during certain periods.

The management of a project such as Primus is usually a comprehensive task. However, the main management vision tasks in the Primus project can first be pointed to the management of the process that led to the IS project including

agreements, second, to the project management and its strategic compatibility with the city and department goals, and third, to the project's economic management.

In the early stages of the Primus project the ability to analyze the benefits of the investments became crucial. Since there were several other investment targets at the same time, the information systems investments had to be strongly justified. It seems that the management could not specify the benefits of the project very clearly since the city's decision makers were not able to have a concept of them. The benefits were defined on quite a broad level as "improved processes" or "better customer service", which can in fact be a consequence of several other investments. The distinction between possible IS benefits and other benefits was thus unclear.

Public health care acts in co-operation with several other health care services, and the IS strategy should be able to answer the challenges of the communication with them. The more the electronic communication increases, the more the compatibility of the systems should be emphasized.

> *"The project is based on the organization's diversity. The care of the patient is a continuum and the administration of the patient information should respond to it. The services are in different units, so the administration of patient information is the key problem."*

However, in addition to the strategic level, the benefits should also be apparent at the users' level. The survey of the staff showed that the goals of the Primus project were stated well and the project was seen as necessary. The feedback in the surveys about the communications during the project, and the usefulness and initialization of the information systems was quite positive in general. However, the relationship of the project to the staff's own work practices was partly unclear.

The strategic compatibility of the Primus project was intended to be ensured by updating the health department' s IS strategy at the same time as the project started. However, since all the effects and parts of the project were not clear at that stage, there was a need to update the strategy as soon as possible.

In the case of public health care, the strategic compatibility with the city's strategy and the national health care development strategies creates its own management area. At the national level the strategies are usually quite loose, but they do include some statutory decisions that have to be considered at the local level.

One significant issue in the project was that there were no strategic tasks addressed to the city in the department's IS strategy. In the organization of the municipality management the different departments are under the city

management. With no responsibilities, city management's commitment to the project remains loose, which can hinder gaining the benefits of the project in the long run. The commitment of different stages of the organization should be visible.

In such a project, where one investment has displaced other investments, economic management is important. The follow-up and development of the costs should also be closely controlled by a party external to the project group. In the Primus project, following the actual investment was sometimes difficult, not to mention the operating costs when the system was in use in the departments. At the time the parts of the projects were in operation in the different departments and wards, the operating costs were included in other costs and thus difficult to follow.

There are three important resources arising from the Primus project that concern the management vision. The first is the ability to analyze the benefits before and after the project. The analysis should be continuous and include both visible and measured with money as well as hidden costs and benefits. The latter are important for the organization's development, and the former in rationalizing the investments. In addition, the views and expectations of the staff should meet the management vision. The benefit analysis requires a complete knowledge of the area. In the Primus project the project group included both health care professionals and IS professionals, and other professionals were asked for comments when necessary.

The second resource is the ability to create comprehensive strategic plans for the organization. A special feature in the public sector is the consideration of several external changes and possibilities - national level, city level and demographic level changes all affect the management decisions. This requires good skills and knowledge in addition to knowing one's own internal environment, and knowledge of the national level development and the skills to develop strategies. Long-range strategic plans are used in the private sector. Someone from the city management should have been a memberof the project group as the project was health care department-oriented and the commitment of city management remained low. The co-operation inside the city was modest.

The third resource is the ability to follow the economic development of the project. The money used after initial investments in IS projects can be considerable.

7.4 The governance structure challenge – defining the right form and control for the IS function

The governance structure challenge is manifold and broadly defines how an organization plans and controls its functions like IS. In the IS case the governance structure includes more than just management of the IS. The governance structure needs management but it also appears in management. The governance structure issues and tools for analyzing governance structures were discussed in Chapter 5.5.

Although there were several functions in the Primus implementation project, the main emphasis was on outsourcing and its subareas:

- the building and maintenance of the IT network
- hardware maintenance
- administration of applications, including EPR.

Figure 26 shows the main governance needs in the Primus project. With outsourcing contracts the organization is usually attempting to reduce its own efforts and risk in the outsourced area. In addition, the outsourced areas seem not to be within the organization's core competencies. These were also the main arguments in the Primus project.

> *"Strongest argument is surely that in this (outsourcing) the customer can concentrate to its own core business and don't have to ponder as such very big and expensive implementations and all the concern connected to it."*

> *"The functionality is secured best in this way. It relieves the life of customer."*

Another argument was that the budgeting is easier.

> *"When you buy this (IS) as a service, it is easy to budget on a year level and to know how it goes then."*

Another reason it is difficult for the public sector to hire people since the salaries are not competitive with private industries. The comment from the department management was:

> *"If we wanted to hire(IS) professionals, then whole salary payment structure should be changed. The salaries of experts are much higher*

than the ones for decision makers in public sector and that wouldn't be quite possible."

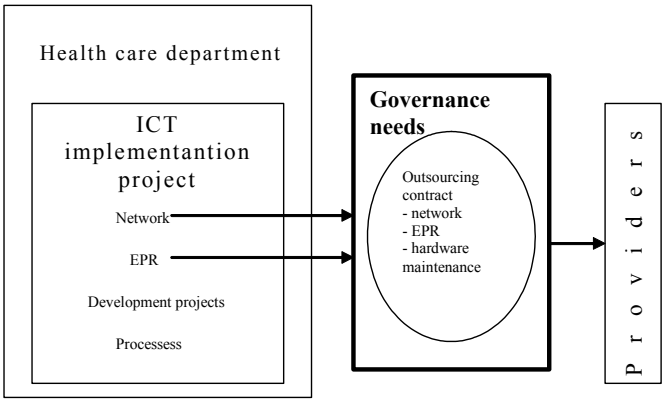

Figure 26 The governance needs in the Primus project.

In the Primus project the organization had no previous experience of outsourcing such a large technological solution and even nationwide the solution was a new one in the public health care environment. So there were no baselines from which the organization could have sought examples of structure or guidance for the solution. The outsourcing contract was agreed for a five-year period, after which the outsourced services were set for public competition. Thus it can be considered a long-term exchange relationship. The new situation set high requirements for managing the relationships and new governance structures had to be created.

The rules and guidance functions play an extremely important role in such contracts. From the determination in hapter 5.5, the rules on how to perform an exchange relationship and, especially, how to control and follow-up an exchange relationship are absolutely vital. Without strict rules the transaction costs can rise unexpectedly high. The sources of transaction costs are the complexity of the product, opportunism and bounded rationality. Opportunism is also related to trust. With contracts, these elements can be eliminated to some extent, but not all of them, as we noted a few times in our case. There were misunderstandings about the maintenance level and responsibilities, and, especially with the software provider, about the corrections and new features in EPR. The problems and limitations in EPR caused problems in the practical work.

Public health care organizations basically operate with the same rules and procedures. However, as said earlier, the organization's size affects its complexity in administration. This complexity also affects the governance

structures and management. On the other hand, small organizations have less expertise to execute IS projects and that lack makes the project complex, even in that environment. Although the large organizations have more complex projects, they also have more resources to solve them. IS outsourcing is more complex than many other forms of outsourcing since IS pervades, affects and shapes most of the organization's processes in some way. The changes happen whether the organization is small or large.

Since organizational traditions and governance structures in health care as an industry have long traditions, it is not easy to shape or create them anew. However, health care has to learn to create and use new governance structures if it wants to keep up with the technological development. IS facilitates and forces organizations to consider new governance structures, so in that way IS is acting as a catalyst in renewing health care structures deeper and wider than just IS requires. The old structures are challenged and their existence is put under close examination.

The introduction of IS challenged the old governance structures and made it possible to introduce new ones. The organization had an opportunity to change the general governance structures because of modern IS, but this proved to be a difficult way to go.

From the resource point of view, new governance structures need new resources. The outsourcing diminishes the need for IT knowledge-related recourses but increases the need for administrative knowledge-intense resources. The outsourcing agreement needs the ability to control the often complex interrelationship between two or more organizations.

7.5 The resources allocation challenge – the competition for resources in public health care

The resource allocation challenge includes the complexity between the number of investments and the scarce economic resources. In addition to a number of investment targets the complexity is increased by the number of stakeholders in public decision making. Each has their own strong and, in their own opinion, well argued justification that their suggestion for investment should be realized. The issue of stakeholder expectation and investment focus is discussed in Chapter 5.6.

The Primus project evaluation research gained a lot of interest from the several stakeholder groups. It served at least the following stakeholders:

- The City of Turku, which is represented by the following stakeholder groups:

    - Political decision makers, who want to know whether they have made wise investment decisions.
    - The staff of Primus and the management of the health department, who want to know whether the project has been run professionally and well.
    - The taxpayers and customers (patients), who want to know whether they get value for their money.
- The staff of the health department, who want to know whether their working conditions have been improved or not.
- The vendors Sonera and Novo Group, who want to know whether the case has potential for a successful reference case and product.
- The general audience, especially:
    - Other municipalities, who want to know whether they could successfully duplicate the approach Turku has taken.
    - The scientific community, which especially seeks.
        - Evidence of the blessings of information systems in health care.
        - Methods for evaluation of information systems in health care.
        - Other potential vendors, who might want to explore new business models.

On the basis of these categorizations above and the categories in Chapter 5.6, the following groups can be defined in the Primus project:

- customer level
- care production level
- technical level
- management level
- city level
- inter-organizational level.

Each group gives their viewpoint on the need for health care IS and the success or failure of it, and are thus excellent sources of information. The stakeholders' expectations steer the decision making at the management level and the management should be able to exploit that information.

The customer level in the health center broadly comprises customers who are in the ward, in the emergency rooms and those who attend during the normal consultation hours. In addition to this, the increased organized patient groups have to be considered since patients are increasingly demanding a bigger role in their treatments and the patient group organizations are the ones who strive for them. The patients' main interest is in the communication with the staff, which is included in the care level in the categorization above. Therefore, from the IS

level point of view, the EPR application and data network, which offer the information needed in communication between patients and staff, are where the biggest expectations are focused. The patients don't necessarily realize the change from manual system to IS if the communication goes well, but if there are problems, the systems will become concrete to them. The communication should be fluent without forgetting the social and human aspect.

Care production includes the supportive staff, nurses and doctors whose expectations in the Primus project were mostly focused on process development, including better access to and better accuracy of information, and through that to time savings. The expectations of the benefits were quite clearly focused on customer benefit. Economic issues were also raised. IS was expected to bring savings. The comments by two members of the staff:

> *"The customer no longer has to muck about. The one-door principle for the customer has been the most important goal."*

> *"The customer gets the best possible service and all the information and other stuff is available for the staff, and there is no need to seek them from everywhere."*

If the patients are satisfied with the services produced with the help of IS, one could come to the conclusion that the communication with the patient goes well. However, although the staff seemed to be satisfied with many features of the new IS, there was also some disaffection. For example, there were a large number of staff who thought the access to the required information was not very good, and the recording of the patient information seemed to take longer than in the era of paper files. This might have a connection to the doctors, who now had more responsibility in writing the patient consultation information themselves instead of previously just recording it on tape. The situation is commented by a member of staff.

> *"The goal was that the workload would diminish, but that has not happened."*

Two more essential areas affecting the realization of the expectations of the staff focus on IS training and IS support. The support should be fast and easy to access; in the patient consultation hour there is no time to wait for a system to restart. Also, when new features are launched in the system, the training should be arranged even before the update and all, even minor, changes in system should be explained. These expectations are hard to accomplish, especially in a large organization. Therefore, the communication system between IS suppliers, IS support and staff should be fluent. In the Primus project there seemed to be a lot

to do in this area, especially in the communication between the system suppliers and the health care staff.

The technical level means the kind of expectations it has towards the development and effectiveness of IS. Even though the technical support is mostly concerned with technical issues, it doesn't mean that fluent work for the staff is not their concern, but there still seems to be a gap between IS staff and health care staff. The interest is, however, usually realized in the form of technical development, sometimes at the cost of functionality. Another view of the technical level interest is the connection to the system providers. In the Primus project this mostly concerned the application and infrastructure level. Since the organization's technical staff are the first contact when a problem emerges they have to have clear and fast connections to the system providers. Another concern is the development of IS in the organization. The strategy developed at the organization, city and national level affects their work considerably. The concern is how the development is going to affect the total development of IS and what resources are needed. In an outsourcing situation like the Primus project, the role of the IS department is diminishing and the satisfaction with the development is not very good.

The management level includes the organization's management, boards and trustees. Their concerns quite naturally mostly relate to the operational and strategic management. The system development should follow and support the guidelines of the organizational strategies and the operational activities. The reality is that often the expectations do not meet the reality, especially at the level of boards and trustees and in city management. This is mostly due the new situation with IS as a new resource, which the management has not been able to use with the same effectiveness as the older resources. However, this is expected to change as experience increases.

In the Primus project the health care department management and the project group had a clear focus on why IS should be developed in the organization. This was divided among the other stakeholders, but in a quite general way. For example, There was some confusion in the city's health care board as to what the effects of the new systems would be. On the other hand, even though the visions were divided amongst the staff on a quite general level, it seems that it was a satisfactory level since the general opinion was that the communication from the management was satisfactory. Thus it seems that the further from the kernel of the organization the visions are, the more difficult they are to internalize. The internalization of the purpose of any development project is a key issue in creating expectations. Compared with the P-S case, the Primus project was considerably larger and the stakeholders were more easily informed of the need to develop the system after its implementation. Thus the size of the organization

and the number of alternative investment targets also affects the expectations management.

The inter-organizational level includes the national level, like ministries and the international level. The concern and expectations of the inter-organizational level in Finland mostly concern the networks between different health care organizations and their partners, the integration of systems and determining the information contents, concepts and terms. The State-wide network, where the information is accessible no matter where the patient is, is one of the key goals of the ministries. Thus, the government level expectations focus on the local level solutions in that they should support the national co-operative operability. The goal for more effective health care is pushing from one direction, diminishing the resources from another. This makes the reality of the inter-organizational level expectations rather unlikely.

7.6 Summary of the findings in the Primus case

The decision making in the process that led to the Primus project and the implementation of the new IS included more discussion and arguments than in the P-S case. However, as a distinctive general feature of the Primus project it could be said that after the decision to invest in IS was made, the project itself went well and the implementation was mostly managed with good skills. And the research differed from the P-S case in that in the Primus case there wasno strategy or plan; the research task only included evaluation and reporting the findings. However, some suggestions were made.

Mindset problem: The problems in mindset were mostly about how the different stakeholders understood what was included in outsourcing solutions and the role and content of competitive bidding. The size of the outsourcing solution was exceptional in Finnish health care and created a certain amount of uncertainty in each stakeholder. The resources that should have been emphasized in mindset in the Primus project were the ability to organize competitive bidding, the role of the project group and the co-operation skills.

Management vision. The management's vision of the benefits of the Primus project was quite strong. However, that did not seem to have been very well distributed to the stakeholders of the health care. Thus the areas where resources should be emphasized in such a project as Primus are first, the ability to analyze the benefits of the IS project and to distribute that vision to the stakeholders. The benefit analysis tells the organization what to expect from the system and which systems to invest in. The second area was to define the strategic compatibility with the organization strategy and city plans, and the focus areas. The third resource allocation area was the investment and operation costs follow up.

Intensive reporting on the budget creates trust among financiers and is seen a key area when additional financing is needed.

The governance structure. The governance structure problems mainly emerged in the Primus project's outsourcing solution. The main arguments for outsourcing were risk reduction, easier budgeting and difficulty in hiring IS people. Although the arguments were well reasoned, the outsourcing did not relieve theresponsibility. In such a large and new project, experience of understanding the content and taking care of all the contractual agreements and technical solutions should be emphasized. Thus the management resources have to focus more on contractual knowledge, and there is less need for pure IT knowledge.

The resource allocation. The resource allocation much depends on the stakeholders in the organizations and their opinions on suitable investment targets. The stakeholders were divided into six groups. Each group had their opinions on the IS investment, but the further the organization was moved from the kernel, the more blurred the goals became. Thus the expectations of the board of trustees can be affected but the means have to be different to the expectations of the organization's management or staff. The size of the project and organization also affects the difficulty in managing the expectations.

8 SUMMARY OF THE FINDINGS

In this chapter the summary of the empirical findings is presented first and placed in the framework. The areas where management should focus resources can be seen in Figure 27. The resources are not defined concretely as their structure and content may vary between organizations. For example, the strategic co-operation with the supplier can be done at different levels and with one or several suppliers, or the structure of the IS organization can be created in different ways. At the end of the chapter there is discussion of the use and applicability of the resource-based approach in the health care environment. These theoretical findings are presented in Chapter 8.2.

8.1 Summary of the empirical findings

8.1.1 The mindset challenge –how to define the roles, contents and tasks in an IS project

The communication with the suppliers and partners in the IS field seemed to be a problem in both case organizations. As such, this is not a new finding (Koh, Ang & Straub 2004), but the problems probably culminated in the organizations as there was not much previous experience and expertise in the IS field. Both case organizations were quite dissatisfied with some functions, especially in the EPR, and they felt that the suppliers did not understand the problems the malfunctions and deficiencies caused for the users.

One reason for the problems in communication was that health care had only started to use information systems during the previous 10-15 years (Grimson et al. 2000; Nykänen 2000, p. 49-51) and the fast development of the IS field has already made it a quite complicated area. In a way, health care jumped in when the speed was already fast; either the IS suppliers did not have experience of the health care sector or had only had it over a fairly short period, and the same methods did not fit health care as they fitted private sector organizations (Lorenzi & Riley 1995). Thus the starting points in moving into the IS era were not very good.

The pace and the all-inclusive implementation caused problems in both case organizations. First, the negotiations were problematic, since it was difficult to get a comprehensive picture of the systems and their effects. Second, the communication with the suppliers was difficult since both lacked expertise in the respective partner's business area. Third, the complexity of the municipal decision making meant there were numerous opinions on the need for the system. Fourth, the internal IS organization and its relationship to other units and users were unclear.

The resources the case organizations lacks are mainly internal, but also partly external. The theory of the resource-based approach defines that the resources that should be emphasized depends on the strategy it chooses (De Wit & Meyer 1999). Therefore, if the organizations are going to increase the IS investments and outsource the resources to support them, they should be increased and strengthened. In the case of communication between the partners in an IS project, both the knowledge of the IS field and the skills in making agreements should be emphasized. In larger organizations the IS knowledge is often handled by the IS management, but since IS in health care organizations was previously quite modest, so was the IS organization. There was often technical knowledge but it lacked the administrative organization for the wider IS planning (Koh et al. 2004).

In the current state of health care organizations, neither of the areas is at the heart of the organizations' knowledge. Since health care has adjusted to operating quite independently of the development of other industries, and likes to emphasize it, (Turunen 2001, p. 18) the IS skills and knowledge of agreements and external possibilities has developed slowly. This came up in the cases in that most the decision makers were almost confused about what the agreements with the suppliers actually included and what should be done with the agreements. It was quite apparent that such decisions were totally new in the organizations. Therefore, when there is not enough internal expertise and the possibility to increase the expertise of the current staff is not likely, the organization should use external resources.

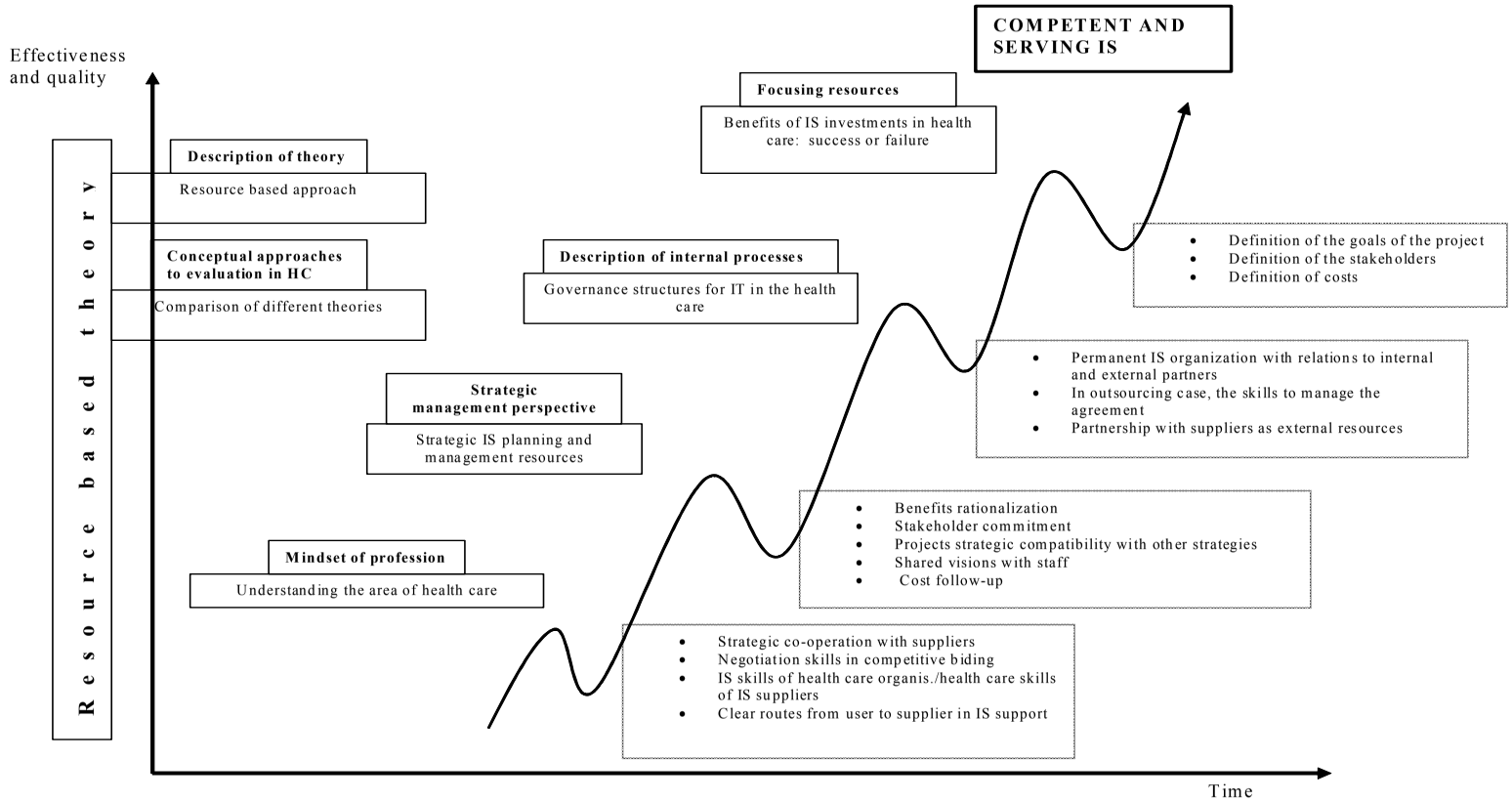

Figure 27 The areas where the resources should focus in the IS project.

In the P-S case the solution was to suggest establishing a joint venture with other health centers in the region to manage the IS functions, which would diminish the pressure on increasing IS knowledge within the organization. But, on the other hand, this would increase the need to manage the external relationships and, thus, management skills in that field.

The theory of knowledge management and sourcing analysis offers a basis for joint organization consideration (Hibbard 1997; Wiig 1997; Smith, Mitra & Narasimhan 1998). The first emphasizes the organizational resources originating from internal and external knowledge-related effectiveness and collective expertise, which strengthens the knowledge capacity. The second emphasizes the consideration of what to outsource and how the structures in outsourcing should be constructed. The relationship of the theory to the resource-based approach is presented in Chapter 4.1.

The internal resources in the two cases are related to the internal IS organization and communicating it to the staff and suppliers. The problem, especially in P-S, was that the information did not flow between the participants, which, in turn, created uncertainty. The new and clearer organization was suggested to the federation.

The cases showed that the problems in communication usually originate from the lack of understanding that the information needs clear routes, rules and places to end up for the user. The new systems or organization structure often destroy or hide the previous paths. Therefore, in a situation where there is a larger change, there is a need to check the information flow processes. This is especially needed in the case of an administrative IS implementation like EPR since it holds the most of the information the organization needs.

8.1.2 The management vision challenge – how to define the goals of the IS project

There were five areas in the case organizations in which the management vision was emphasized as a resource. First, the management should rationalize and concretize the benefits of the IS investment to the different stakeholders, who might have a different opinion on the investment targets. Second, the management should commit the stakeholders to the project or there is a threat that it will not get the required resources to be completed or the resistance will otherwise grow too strongly. Third, the strategic compatibility of the project with the other strategies should be clear and strong. Fourth, the staff should share the visions of the management or the implementation will fail. Fifth, the costs of the project should be understood so that the final costs don’t exceed

the budget, as is the case in most IS projects. The cost estimation includes at least a rough estimation of the intangible costs.

The rationalization of the benefits requires the ability to understand the environment of the industry and its development, as well as the development of the IS area, and finally to combine these and analyze the benefits. After that the understanding should be implemented with the different stakeholders, who have different conceptions and expectations of the benefits (Kumar & Subramanian 1998). The interaction between stakeholders regarding their roles and how they can interact with the project can also affect the project. Furthermore, the expectations may change during the project, which can affect the gap between goals and expectations (Pan 2005). In the Primus project the whole project was prepared very carefully, but despite that there was clear opposition from those who would have preferred other investment targets or at least better preparation of the project. They would also have liked the scale of the whole project to have been smaller. However, this would have changed the management's plans for the scope and the goals.

The commitment of the department's management was strong in both cases. However, since the area was new, the wider stakeholder group, like the municipality management or staff, was distinctively confused about the project. The stakeholders should see what their position and role in the project or process is. Is it just to accept all that is coming or can they affect the decisions and outcome? Even better, a stakeholder, like the personnel or a personnel group, could address certain duties, which would clearly benefit the project (Pan 2005).

The IS strategy compatibility with the organization's business strategy was well understood in both cases. Although the IS strategy in the Primus case was not able to consider all the benefits, its updating showed that the strategy's implication was understood. The ability to see larger entities in planning the project is clearly a management duty, which can become a resource in the sense Barney (1991) sees in his framework.

The users are a resource that can be strengthened by defining the effects of the project on their environment and work. The user is mainly concerned with how the project is going to affect performing the work and if it is going to be more complicated (Goodhue 1995; Malhotra & Galletta 2004). The uncertainty about the project's effects on one's own work or even if there is work after project will certainly diminish the motivation to work. Although the staff are mostly concerned with their own work and how the changes affect it, they also need a wider perspective on the development in the organization. This did not succeed very well in either of the cases.

The division and follow-up of the costs is often a problem in IS projects and neither of the cases in this thesis was an exception. Money is undoubtedly the

dominant resource when it comes to the development of any organization. Therefore, the management's ability to estimate and distribute it so that it most effectively affects the organization's development is crucial. The ability to acquire the right components for the organization with the existing economic resources becomes a central resource.

8.1.3 The governance structure challenge - defining the right form and control for the IS function

Information systems implementation inevitably changes the governance structures in any organization. The IS itself is a new structure to govern and it also creates new structures as well as supporting some other structures (Suomi & Tähkäpää 2003). This has been discussed in more detail in Chapter 5.5. In both cases the governance structure issue was not defined very well, although in the Primus project the outsourcing solution as a structure was already planned in the first stage of the project.

The organization ended up with two different solutions. In P-S there was no clear organization to handle the IS function and the solution was to create a new structure with internal responsibilities (Figure 24). In the Primus project the organization decided to outsource the whole IS infrastructure. Both cases needed to restructure the governance in a new situation.

In P-S there were two critical goals when the new organization was determined. First, it should clarify the communication between the users and the person in charge of certain application.; previously, there was no a clear division of who was responsible for which application. The structure cleared the problem-solving path and also gave the management more time to concentrate on the strategic and operational management of the information systems. Thus, in addition to clarifying the organization responsibilities, the new governance structure released the management resources to their actual purpose.

Second, the new organization was expected to clarify the communication between the federation and the IS suppliers. The persons who were responsible for the development of certain applications (owners) were the ones who were in contact with the suppliers. This reduced the useless contacts and the owner had a clear picture of the state of the application development. Another goal in dividing the responsibilities was that over time the owners could become a specialist in the applications, twhich would improve the resource base in the organization.

In the Primus project the outsourcing solution was ended because of the size of the new information system. The skills in the health care department

and the resources in the city's IS department were not sufficient to maintain such a system or at least there would have been a need to hire new IS people. However, the project group was managing the implementation process and knowledge was being accumulated in the department.

The outsourcing solution created a need for different kinds of governance structures. The outsourcing agreement had to be managed, and when the outsourcing solution was not used, new skills had to be developed. The critical resources were the knowledge of the IS area and juridical issues. The goal in managing the outsourcing contract can be a kind of partnership in which both partners benefit from the contract; in addition to economic benefits, the supplier can acquire information on the industry, and the outsourcing company can benefit from a better service. This was the idea in the Primus project, so the goal was to increase the use of external resources.

8.1.4 The resources allocation challenge – the competition for resource allocation in public health care

Resource allocation defines and prioritizes the importance of certain functions and operations from the viewpoint of several stakeholders (Kumar & Subramanian 1998). It is clear that in the care processes the health care personnel decide on resource allocation, but in the administrative and managerial functions the number of stakeholders is much wider.

In allocating resources it is essential to define and separate the benefits of the investment. The expected benefits vary from the stakeholder's viewpoint and the opinions on the importance of the different investments depends on the stakeholder (Lyytinen 1988; Wilson & Howcroft 2002). Thus the identification of different stakeholders in order to clarify their assumptions also becomes essential (Pouloudi & Whitley 1997). Another essential area is to assess when the investment is successful and when it is a failure (Lyytinen & Hirscheim 1987). The assessment often depends on the person's profession, position, experience, political viewpoint, etc. So, subjectivity is always present when evaluating the success or failure of the investment.

The flow of information between the different levels of stakeholders becomes evident when decisions about the investment are made. The stakeholders who make the decisions about the investment project and are in charge of it are in a central position in spreading the information. Thus the inter-relationships and the information channels between the stakeholders should be clear (Pouloudi & Whitley 1997). In both case organizations in this thesis the flow of information was basically functioned well inside the organization, but the problems were concentrated on communication with

suppliers, especially since the EPR providers did not react quickly enough to contacts from P-S and the Primus project. This caused many problems in systems use.

Although there was disagreement about the investments in IS the general opinion was positive in the case organizations. In the Primus project the arguments were mostly related to the scope of the project. Some stakeholders had the opinion that the project could have been less extensive in the first stage. In P-S the arguments concerned the changes and stress in the work since there were other projects going on at the same time. The opposition would have liked to avoid the overlap of the projects.

In both case organizations the investment superseded some other, more health care-related projects. However, the management of both organizations succeeded in reasoning the long-term effects of information systems. The investments were part of the strategy of the health care department and the city, and followed the guidelines of the national strategies concerning health care development.

From the management point of view the resource allocation and the stakeholders can be divided into internal and external resources and stakeholders. Of course, the amount of internal resources depends on the grants from external stakeholders. However, the stakeholders on both sides can affect the resource allocation with their opinions and conceptions, which are sometimes affected from outside too. The political decision making in the public sector is a good example of this.

From the resource-based view, the organization should concentrate on managing the definition of benefits for the stakeholders. Before that, the most important stakeholders the project is going to concern have to be identified. Depending on the role of the stakeholder, the reason to invest in a certain target and why some other has to be superseded becomes crucial in following through the project. In addition, the cost of the total project has to be clear so that the project can be completed as intended.

8.2 Summary of the theoretical findings

In this thesis the resource-based approach was used as a theoretical ground to discuss the different areas of IS projects in health care and the strategic perspective of IS. The resource-based approach was discussed in detail in Chapter 4.2.

However, there are several theories and approaches that could be used. Most of those theories include a relationship to the resource-based approach. These relationships were discussed in Chapter 4.1.10. The discussion suggests

that each of those theories can contribute to the discussion on the resources and their use in health care. The resource-based approach can be regarded as being influenced by all the discussed theories. This is not to say that the approach can be used to replace the other theories but that the other theories stress the important issues for the resource-based approach discussion.

The discussed theories are mostly based on certain skills and knowledge, which should be present in the organizations. The resource-based approach also emphasizes the capabilities and competencies that define the needs and strategic use of them (Barney 1991; Black & Boal 1994; Hoopes, Madsen & Walker 2003). The long-range viewpoint is thus emphasized, which, in health care, is important, especially in IS development. IS needs to become a genuinely key resource and not just a one more area to develop independently.

However, the problem in using the resource-based approach also lies in its scope. It is easy to include several other viewpoints and the focus can be difficult to hold clear. Since many other theories and approaches give their contribution to it, research using the resource-based approach can become a rambling entity. Therefore, it is important to find which characteristics are picked from other viewpoints and stick the discussion in it. This principle holds in this work too.

There are several definitions of the resource-based approach but basically the approach has been developed for the profit-based business environment and it emphasizes the sustainable competitive advantage and superior return on capital (Amit & Schoemaker 1993; Andreu & Ciborra 1996). However, although the final focus of the approach is in gaining competitive advantage and maximizing profits, there are always resources that have to be identified before the goals can be realized.

Thus, the approach defines that the organization has to have the knowledge to create competencies and the ability use those capabilities before it can reach the competitive advantage (Prahalad & Hamel 1990; Markides & Williamsson 1994). Therefore, it can be said that the process of creating those capabilities and competencies becomes a key factor in the resource-based approach. The goal of the process can then vary between organizations and industries. In Chapter 4.3 there is discussion of how, by changing the ultimate goal in the resource development, the approach can also be used in other industries like public health care, which don't have the profit goal.

Thus the resource-based approach also fits the health care sector. In defining the resources, the idea of creating resources from the network of ties (McEvily & Zaheer 1999) and the organization's ability to find and use the organizational competencies and capabilities (Prahalad & Hamel 1990) fit well with the mindset problem. The ability to manage external ties becomes important when those ties increase, like in health care where the outsourcings

of different areas like IS has become more prevalent. In that case, the organizational competencies and capabilities focus more on the management of external ties than on creating them internally. This has challenged the public health care area to expand its understanding and knowledge in a more business-oriented direction where the networks of subcontractors, distributors and clients are already a routine.

In the categorization of eight key IS resources, Wade and Hulland (2004) emphasize the IS business partnership and eternal relationships management resources. A partnership should be created with the system vendors as well as, in the public health care case, with other health care organizations. Results sharing with other organizations increases the knowledge of each and the effects om the resource development.

The resource-based approach emphasize its applicability as a strategic tool. Resources are defined as strengths the organization uses in developing and improving its strategies. Although health care organizations have also previously defined strategies, their use as a long-range planning method has increased and their role has changed to more business-like planning. Effective strategic planning requires that only the most essential issues that affect the organization's actions in the long run have to be included, and that those issues can be integrated (Rumelt et al. 1994). In this sense, the resource-based approach gives good grounds for developing the management visions in a public health care organization. The goals of an IS project have to be considered with other strategically important areas.

DeWitt and Meyer (1999) divide the strategies into the three dimensions: process, content and context. The increase in strategic planning in public health care challenges it to reconsider each of these dimensions since the planning environment has been widened. However, at the same time, the scale of the strategic planning has narrowed from the earlier industry-wide consideration to more practical questions (Foss 1998). This will probably offer health care an easier way to move from the previous administrative planning to more business-oriented planning. The planning process will include more practical issues, which are likely to be more familiar to health care when it can concentrate more on its individual strengths and resources.

The definition of Mata et.al. (1995) includes the notion that IT management skills are the only IS skills that lead to sustained competitive advantage. Although public health care doesn't aim at competitive advantage, it emphasizes the importance of management skills in IS development. The theory of organizational learning also fits well with IS management since IS projects in public health care are a quite new phenomenon that forces the organization to consider its operations and structure in new way.

The IS projects and IS function need new governance structures. As such, the development of a governance structure relates to the management visions, but is focused on a smaller part of that vision. The governance structure as a resource to develop and maintain the IS function as a strategic area requires skills that are also quite new to the public health care area. The earlier definition of governance structure in health care was more clinically emphasized, but with the rise in the strategic view it has to emphasize the customer service and effectiveness view more. However, the governance structure issue is less discussed in the earlier resource-based approach literature.

One of the most important things in creating governance structures for IS is to ensure that those structures enable the integration of other resources with IS. For example, Short et.al. (2002) emphasize this when saying, in a quite general way, that the manager's job is to organize the resources in such way that they are in their most effective form. Thus the management should define the organization in its strategic planning in such a way that it integrates the existing resources and the new resources.

The resource allocation is related to the strategy discussion about priorities. Nurmi (2000) discusses two different ways to see the priorities. The main issue there is whose interest the strategic planning is going to stress. In health care the investment focuses are numerous. The critical factor here is how the management can convince the stakeholders that IS will improve the services of the organization in the long run. Another challenge is to have the stakeholders commit to the IS development in the long run. Chaffee (1985) stresses that strategic planning can act as a metaphor or frame of reference in committing the stakeholders to believe and commit in such a way that it will enhance the organization's results.

Wade and Hulland emphasize in their framework that cost control and cost-effective IS operations is one capability the organization should possess. This is also related to the resource allocation and to the commitment of stakeholders. Too general, blurry and too much jargon may reduce the stakeholders' interest and trust in the investment. Therefore, though a difficult task, the cost definition is a central area on which management should focus.

The resources or, more likely, the areas in which resources should be focused are mostly intangible and related to management and human skills and knowledge. From a resource-based approach point of view, they are such that create the competitive advantage for the organization since they are organization-specific. However, at the same time, they are resources that can be regarded as important in creating a more effective organization. The goal in the public sector is not to gain profit, but it has similar effectiveness and quality requirements to any other sector. Thus the resource-based approach

can be regarded as a very suitable strategic planning tool for public health care. It gives a base and ideas to study the industry from a new direction and probably affects practice in pointing out new areas where resources can be found and how they can be integrated.

9 CONCLUSIONS

9.1 How to improve health care services with better management of IS resources

The IS in health care has been increasing substantially since the depression at the beginning of the 1990s due to a decrease in essential resources, of which the economic resources have had the largest impact. The impact has been very similar all over Europe: governments have had to restrain health expenses. The health care sector was forced to seek more effective ways to offer services with the existing, and to some extent diminishing, resources (The European Health Report 2002, p. 4-5). Investments in IS increased and its role in developing health services became essential. Expectations toward IS were high.

In this thesis the goal has been to identify those most essential IS management areas in IS projects and IS development in which the increase in resources can contribute to health care so that the IS can develop as a key resource and affect the performance. In many ways this goal has been difficult to achieve since IS is often seen just as a technology that doesn't have immediate impact on care and treatments. There is a need to prove that IS can contribute to the performance and ultimately affect even the quality of services (Devaraj & Kohli 2000; Menon et al. 2000). Another issue to emphasize is that IS alone can seldom contribute to the organization's production; it has to be integrated with other resources (Barney 1991; Wade & Hulland 2004).

A noteworthy area in the increase in IS investment is the expected and realized impact on the level of effectiveness and quality. That impact is very difficult to accomplish or prove since even in the private sector, which has used IS longer than the public health sector, the impact has not been clear. One thing the studies do show is that after a period of some increase in effectiveness after the depression of the 1990s, the effectiveness in public health care has not increased (Räty et al. 2002; Linna & Häkkinen 2004). Basically, this does not tell us anything about the effectiveness of IS but it does tell about the overall development in health care. However, at the same time as the effectiveness has decreased, the IS investments in health care have increased substantially. Thus we can at least argue that IS implementation has

not increased the effectiveness so much that it has eliminated all the factors that have diminished the effectiveness.

Even though we don't really know what these diminishing factors are, the research points to the fact that there are remarkable differences between the effectiveness of different health care units (Räty et al. 2002), and thus considerable possibilities to boost the effectiveness. There are differences in both the effectiveness of service production and economy, so we should find those that are not effective and those that are, and find the difference between them – remembering the social and human differences in each unit.

The first research question of this thesis is: *which are the key areas in which the health care management should focus in IS projects in order to ensure that the project will be effectively implemented and have a positive effect on the organization's functions?*

It has already been established in the discussion on the resource-based theory that IS alone cannot be a source of sustained competitive advantage or, in the health care case, increase effectiveness so that it increases performance and quality permanently. It has to be integrated with other resources to produce the best possible combination in order to increase sustained effectiveness.

The cases in this thesis show that this process is not yet accomplished. IS has so far been able to change some routine processes but the deeper impact is still to emerge. However, it seems that the integration of IS with different processes and activities is understood to be important. For example, in the second case there were several process development projects waiting to be started. Lack of time and money were, however, still an obstacle to their further development.

Although resources in health care are many, they are also dependent on the special features of the organization. Resources are mostly intangible and based on the long and sometimes unconscious development of a stable organizational environment. The meaning in health care is not to develop them as a competitive weapon or as an obstacle to entering the industry but more to ensure the effectiveness and the quality. Although the motivation to identify those resources is different from the private sector, the process of identifying them is somewhat similar. And like in the private sector, it is sometimes difficult to identify the most important resources.

The second research question of this thesis is*: Which kind of issues management should emphasize in the key areas of the IS project to avoid barriers and to ensure IS develops as one of the key resources?*

Four areas of management were defined, which seem to play the biggest roles in building obstacles and hindrances en route to IS developing as a core resource in health care:

- understanding the complicated area of health care
- problems in strategic IS management processes
- governance structures for IS organization
- benefits of IS investments in health care: success or failure.

First, the area of health care is difficult to enter for an outsider. There are established hierarchies, processes and professions that are difficult to change (Dixon 1999; Turunen 2001; Doolin 2004). The understanding of the certain "ways of behaving" is important and realizing that systems that are offered to health care staff have to be such that the staff can trust the reliability of the system and the validity of the information that it offers. Although the work in health care is still mostly based on individual knowledge, the dependency on information systems is increasing and trusting the system is a key area.

However, the misunderstanding seems to be mutual. Health care staff have difficulties understanding the social impact of technology and system developers have difficulties understanding the everyday practical work, and its information requirements and processes in health care. This was concretized in the second case, where the initial training was done by the system vendor and problems in understanding the goals of each party emerged.

Metaphors are a way to make the different parties to the project understand the various aspects of each other's environments. Although metaphors are an abstract phenomenon, they might help to understand the complexity and connections of different aspects in health care and in system development (Mason 1991; Kaarst-Brown & Robey 1999). This research added a few metaphors to the list of earlier metaphors in order to give a wider assortment. The additional metaphors are focused on better explaining the social complexity of IS projects and IS implementation. This is especially needed in health care when the complexity of the sector is integrated with other complicated sectors. Added metaphors can again be modified and develop further.

Second, since the IS function is fairly new on the larger scale in health care, the IS management and strategic management processes cannot be very settled but seem to be increasing (Winter et al. 2001; Schwartz & Cohn 2002). There is no doubt that there are organizations, especially large ones, where the IS planning and management is in good shape, but this research argues that there is still no such iteration in management practices, which is needed. The planning and management happens easily in a haphazard order when larger changes are expected in legislation or a demographic situation and there is not enough time to concentrate on it, or when an external impact like a researcher comes along.

However, such a compulsive trigger often forces the organization to concentrate on IS development and can lead to continuous disinterest in the

area. Once the benefits from IS are more widely noticed and accepted, so the emphasis on IS will surely change.

Third, as mentioned earlier, health care has been shaped over centuries and finding out how the social system works in adopting new innovations is sometimes difficult (West et al. 1999). Thus the area is challenging to enter, processes are not easy to change and new governance structures are difficult to establish. However, IS has a chance to act as a change agent in shaping new structures and should be continuously reshaped itself. Governance structures should be a key area of management focus since they are the ones that will last a long time and are slow and difficult to change.

Fourth, the investment targets in public health care are endless. There is increasing need for new premises, new clinical equipment, new and better educated staff, etc. The developments in health care, like improvements in medicine, the increasing share of elderly people and the increase in different new diseases, increase this need. At the same time, the cost containment pressures are continuously on view (Ziegenfuss Jr. & Bentley 2000).

In addition to the number of investment targets, there is always difficulty in prioritizing them. Therefore, it is sometimes difficult to reason investments like IS, which are complicated and difficult to prove to have an immediate or even medium-term effect on the care activities. The viewpoints of different stakeholders should be taken into account when reasoning any investment, and of course in the case of IS investment. The important area is to define what the expectations of different stakeholders are and how they see the success or failure of them (Kumar & Subramanian 1998; Wilson & Howcroft 2002). Otherwise, the opponents for IS investments have an easy and popular weapon in supporting other more "human" investments instead of technology.

In the IS field, simulation of the different solutions and effects is used to reflect the effects of the practical solution. Simulation is especially used when a system is under development and there is a need to evaluate its effects (Nielsen 1993). Although simulation is used in the evaluation of a single system, the approach could be useful in health care to show the possible downsides and rewards of the investment. However, it requires experienced people to take care of the process and to develop the simulation options. Simulation can include several possible solutions.

IS implementation requires more that just the basic software and hardware to gain all the possible effects. Halfway implementation is more likely to cause more trouble than benefits. Even though the IS implementation was seen an important investment in the cases in this thesis, this is the problem in many public sector organizations; they only have a budget for just the most abridged installation. Furthermore, even if there is more money allocated to investments, those are the first things to face cuts if the budget is in danger of

being reduced. Therefore, the implementation of infrastructure might be complete but the changes needed in the organization and processes remain incomplete. This was the situation in the second case, where the process renewal part did not even get started and a few smaller development projects were in difficulties. On the other hand, at the same time, the city started the implementation of an IS in its special health care, which needed resources. The resources were not sufficient to develop both areas.

The four areas presented in this research are those in which the health care management should put emphasis in their IS projects. Each of the areas is wide and includes several sub areas to pay attention to, and the resources vary in different organizations. Thus each organization should find its own strengths and resources with which these areas could be developed, and the obstacles which it should defeat. However, this research highlights some of them on the basis of the two cases.

9.2 Theoretical limitations

In this research the resource-based approach has been used as a theoretical ground. The approach gives an interesting viewpoint from which to study an area in which the resources, their detection and use are maybe in more central focus than in any other industry. The resource-based approach emphasizes resources that are in a central position to help to develop an organization's capabilities and, finally, its performance.

However, the resource-based approach is a relatively wide way of looking at the management in the organization. Furthermore, its use in empirical research has been low. This causes the systematic falsification of the approach to be difficult (Hoopes et al. 2003). The approach has also mostly concentrated on static resources without paying much attention to dynamic resources like innovation and technology research (Foss 1998).

These limitations were partly present in this research. The wide nature of the approach meant that the discussion about the use of the approach in the health care environment remained on a general level. The connection between the approach and practice was not as strong as one might expect because the study attempted to discuss a fairly wide area in strategic IS management. However, it is hoped the research will highlight the use of the approach in a different environment than before - namely a public, non-profit organization. Thus, despite the limitations, it brings some further empirical results in applying the approach.

The use of other theories in the chapter 4.1. remained partly halfway. The theories could have given a better contribution to the empirical part of the

research. However, an attempt was made to emphasize their role later in the same chapter.

9.3 Practical limitations

The empirical findings of this research were gathered from two case organizations. One can always argue that such small sample does not give enough results for generalizing the results to other organizations. However, the public health care organizations offering basic health care in municipalities are somewhat similar in their duties and organizations. Of course, there are always differences in some routines and social environment. The theory of qualitative research emphasizes that the selection of an extensive sample size is difficult because of the difficulties in analyzing it with qualitative methods (Benbasat 1987; Silverman 2000). Thus the sample size is usually smaller and the study has to accept the limits of its generalizability.

Another limitation is that the results remain on a quite general level. On the other hand, research discussing strategic management issues seldom gives very detailed answers to all the problems. However, use of the framework and results in another organization might need some interpretation and adaptation.

One of the original goals of the research was to find the level of IS investment and costs. This goal remained unattainable. The information about IS investment was difficult to get and it was only possible to collect some minor information.

In the second case the orderer of the research was in practice in the same organization we were supposed to evaluate. Thus the research setting cannot be considered ideal. Although the research was done in a good spirit and even the difficult issues were covered, there is always a danger that some material might have been hidden from the research group. Therefore, the results can effect some limitations on certain information. An attempt was made to diminish this with an extensive interview round that included interviewees from different levels of the organization.

Finally, at the time this research was started the knowledge about the health care environment was in the early stages in our university and in our discipline. In the first case especially, this might have meant that some issues that could have given some additional value to the research were not noticed. However, the use of another case reduced this threat.

10.1 Further research

Several areas emerged during this research where more research would have been required. First, the degree of IS investments in a public health care organization was not clear. It was difficult to find clear and unambiguous research or statistics where the costs were presented. Each one that was found was equipped with the remark that the figures presented include a possibility of error because of the different ways of estimating the IS costs in organizations. The problem is that various organizations use various ways to count IS investments and operation costs. Another reason that was found was that the IS investments are still regarded as small investments compared with other costs in health care and regular and strict IS investment follow-up is still not seen as important. It will probably be a challenging task to create indicators and methods for calculating the real costs and investments. However, before such methods are developed it is difficult to say, at least with some satisfactory accuracy, whether the IS investments been profitable and compare the investment with the increase in performance.

The second is the further and more detailed research on the impact of IS investments on other specific resources and processes. It seems that the investments have so far had a fairly small impact on the organization's structures. Real changes have not occurred and it is important to find out why. This of course requires the definition of expected impacts and changes. This research includes a kind of preliminary discussion in the area of health care resource research and presents a basis for further research.

The third area of further research would be to develop a strategic IS planning framework for the area of health care that considers the changes in public administration at the local and national level. The framework should offer the health care organization a tool with which they could follow a regular planning cycle. This research discussed such a framework and addressed the need for a regularly repeated framework as IS planning seems to be an obstacle to the effective use of IS. The framework of the EMIS model was presented in the first case, which could be adapted to public health care.

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APPENDIXES

Appendix 1. An example of the interview form in the Paimio-Sauvo IS strategy development. The first round interviews staff about the environment. The interview has been translated into English from the original Finnish version. The original interviews are available from the author of this thesis.

I Interview

Interviewee:
Date and time:
Place:

Own unit:
The tasks and responsibilities of the interviewee
Which services does your unit produce?
Which of those are the most important (strategically) for the future and what special knowledge do they require?
Do they change the situation in the industry and immediate surroundings (competition)?
Will the status of your unit in the health centre change in the near future?

Customers (the service users, patients)**:**
Who are the customers of the Paimio-Sauvo health centers?
Which customer groups can be identified in your **unit** and are there going to be changes in them in the future?
What is customer satisfaction and what do the customers value in the services of your health center?
What information is drawn on the customers?
What kinds of things affect the customer in choosing the health care unit and how can the health center affect to it?
What is a typical contact with a customer? What kind of chain does the customer go through and what kinds of contacts does the chain have with other units?
What kinds of bottlenecks are there and how they could be affected?
In your opinion, how should the productization be handled and how would it affect the service?

Competition:

What kind of picture do you have about the competitiveness of your organization (cost-quality, service, etc.)
Who are the competitors now and in the future?
What are the strengths and weaknesses of the competitors?
How is the competition going to change in the future?

Partners in co-operation (internal and external)**:**

From where are the services and products bought for your unit and are you personally in contact with the partners?
In what way does the information and material move between partners and how does the IS support this?
In what way are the suppliers chosen and what is the most critical factor in that (old supplier, low prices, reliability, etc.) (external)?
Do the current or future information systems affect choosing the supplier (external)?
What is the reliability of the deliveries, accuracy, fluidity (external)?
In what way should the co-operation be developed in order to function better?
Has Paimio-Sauvo had co-operation with other health centers (Kaarina-Piikkiö, Härkätie, etc) and what has the co-operation been like?

Personnel:

In your opinion, is there anything that should be developed in the personnel policy?
What do you think the work atmosphere is like?
In what way has working conditions of the personnel been developed?
Have the personnel been trained in accordance with their tasks/professions?
In what way has new staff been introduced to the work (or the task changes)?
Other noteworthy things?

Appendix 2. An example of the interview form in the Paimio-Sauvo IS strategy development. The second round interviews the management about IS. The interview has been translated into English from the original Finnish version. The original interviews are available from the author of this thesis.

II Interview

Information systems

Interviewee:
Date and time:
Place:

General:
What kind of systems does the federation have in use?
How should IS be organized so that it would support the business idea of the federation in the best possible way?

IS suppliers:
Who delivers IS services and products to the Paimio-Sauvo health care federation?
How has the co-operation functioned?
Do the suppliers give enough information about their products?
Is it easy to get information from the suppliers in the case of malfunctions?
How do the suppliers take care of the support after delivery (after sales)?
In your opinion, what is the most important thing when acquiring information systems?
In what way are the suppliers chosen and what is the most critical thing in that?
Do the current and future systems affect the selection of partners and suppliers?
Have the suppliers committed to co-operation and what do they value in it?

The use of the system:
What applications and hardware are in use in your unit?
What do you personally use them and which is the most important to your unit and to you?
What kind of information systems use skills do you have? 1 means that you cannot use the application and 5 that you can use it perfectly.

E-mail	1	2	3	4	5
Internet	1	2	3	4	5
Word processing	1	2	3	4	5
Spreadsheet (Excel)	1	2	3	4	5

Graphics applications	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5

Other IS skills:_____

Who is responsible for which system in your unit?

What is the quality of IS support like? 1 means that the support does not function well and 5 that it does not need any improvements

Usability	1	2	3	4	5
Availability	1	2	3	4	5
Support in malfunctions	1	2	3	4	5

Wishes and suggestions to improve the supportive services?

In what way should the responsibilities for applications, hardware and telecommunications be arranged so that it would support your work (IS support)?

Do you personally attend the IS planning? In what way?

Services and customers:

In which customer service function are you using information systems?

What other functions that are essential to your work do you perform with information systems?

What problems have you noticed in them?

How have the customers reacted to the increase in the use of information systems?

Decision support:

Do you get the support from IS that you need (is there useless information) and is the information easy to get?

What do you wish from data connections with the hospitals in the area, so that it would support your work as much as possible?

In which areas are improvements needed? 1 means that there are a lot of improvements needed and 5 that the area does not need improvements.

Hardware	1	2	3	4	5
Applications	1	2	3	4	5
Training	1	2	3	4	5
User support	1	2	3	4	5
Working conditions	1	2	3	4	5

Other areas? Which?_____

What new services could be developed with the aid of IS?
What are the biggest obstacles in the way of IS development?
Has there been any co-operation with the municipalities in the area in IS. If not, what kind of co-operation could there be?

Training:

When is the last time you have been in IS training and what did the training include?
Did the training offer any benefits to your work?
What kind of training would you like more of?
What else comes to your mind about information systems?

Appendix 3. The themes of the interviews with the interviewee groups in the evaluation of the Primus project. The interview has been translated into English from the original Finnish version. The original interviews are available from the author of this thesis.

The office holders, management and elected officials

- The city's strategy, growth, etc.
- Primus project
- Partners in co-operation
- Services outsourcing

The management of the health care department and Primus project

- The visions in health care development
- Primus project
- Personnel
- Partners in co-operation
- Outsourcing

Pegasos (the EPR application) main users and responsible users

- Primus project
- Electronic patient recording project
- Personnel
- Pegasos

Sonera

- The strategy of Sonera
- Primus project
- Co-operation
- Outsourcing

Novo Group

- The strategy of Novo
- Primus project
- Pegasos software
- Co-operation

National organizations

- Knowledge and image of Primus project
- Similar national projects in health care
- Similar international projects in health care
- IS development in health care and outsourcing

Appendix 4. An example of the question form used in the evaluation research with the city management. The interview has been translated into English from the original Finnish version. The original interviews are available from the author of this thesis.

The office holders, management and elected officials

The city's strategy, growth, etc.

1. What kind of expectations does the city have on the growth of the city (population, population structure, social classes, etc.)?
2. What are the focus areas in the city's development in the near future?
3. What are the biggest problems regarding the development of the services?
4. Which services are the most important with regard to the attractiveness of the city?
5. What kind of picture do the citizens have of the services? What kind of feedback has there been?
6. What are the focus areas in the health care development at the moment

Primus project

1. How/why was the project started?
2. What kind of decision-making process is there in the city?
3. What goals does the Primus project have regarding the city's strategy?
4. What kind of results are there/are expected from the project and have the results so far responded to expectations?
5. What kind of expectation does the city have concerning the development projects (inside the Primus project)?
6. Are the costs of the development project as expected?
7. Has the communication between the city management and the health care management/project management about the stages and progress of the project been sufficient and in how has it worked practically?
8. In what way is the Primus project going to be exploited in the co-operation between the hospital district and the social services?

Partners in co-operation

1. How has the co-operation with Sonera functioned? What kind of problems have emerged?
2. How much have the partners in the co-operation (mainly Sonera) told the city's management about the development of their own sphere of responsibilities?
3. Is city going to exploit the services of Turun Puhelin, which it partly owns, in developing the services in health care IS?
4. Is city expecting any long-term investment in Turku from Sonera as a result of the co-operation?

Outsourcing the services

1. Why did the city choose Sonera and not Turun Puhelin?
2. Has the city important outsourcing plans considering the services? Is the outsourcing co-operation in telecommunications with Sonera an indicative project?
3. What is the role of outsourcing in the city's strategy in the long run? Is outsourcing going to be an important part in developing the services?
4. What kind of experience did the city have concerning outsourcing?
5. Is there any contact from other cities concerning the co-operation with the health care department and Sonera?

Appendix 5. An example of the question form used in the evaluation research with the management of the health care department. The interview has been translated into English from the original Finnish version. The original interviews are available from the author of this thesis.

Management of the health care department

The development in health care

1. Which kind of strategy/critical success factors does the health department have?
2. What kind of expectations does the health care department have for the growth of the city (population, population structure, social classes, etc.)
3. What are the focus areas in the development of care?
4. What are the biggest problems in the development of care?
5. Are the investments from the city sufficient for the development of health care
6. Which services are the most important with regard to the attractiveness of the city?
7. What kind of picture do the citizens have about the services? What kind of feedback has there been?

Primus project

1. How/why was the project started?
2. What goals does the Primus project have regarding the functions of the health care department? How is it expected to change the picture of the services in the eyes of the citizens?
3. What kind of results are there/are expected from the project and have the results so far responded to expectations?
4. How has the project proceeded? Have there been any problems?
5. In what way can the Primus project be exploited in the co-operation with the hospital district, social services and other interest groups?
6. Has the communication between the health care management/project management and the city management about the stages of the project been sufficient and has it worked practically?
7. Has the project inside the whole health care department gone well?

Personnel

1. In what way have the personnel received the project?
2. Have there been any differences in acceptance between professions?
3. Are there changes in opinions after the initial experiences?

4. Which are the most important development goals regarding the care?
5. In what way has the development of the personnel's skills and readiness been taken into account in the project?
6. Has there been any feedback about the development of the work processes in a negative or positive direction?

Partners in co-operation

1. How has the co-operation with NovoGroup and Sonera functioned? What kinds of problems have emerged?
2. How much have the partners in the co-operation (Sonera, Novo) told the health care management about the progress of their own areas of responsibility and the development of their own products?
3. What were the strength and weaknesses of Sonera when the negotiations on the selection of the partner to the project were conducted?
4. Are there any other important partners in the project?

Outsourcing

1. Why did the city choose Sonera and not Turun Puhelin or, e.g., Telia?
2. Has the health care department any important outsourcing plans concerning the services?
3. What is the role of outsourcing in the health care department's strategy in the long run? Is outsourcing going to play an important part in developing the services?
4. What kind of previous experience did the department have concerning outsourcing?
5. Has the department applied any experiences and models from anywhere else to the co-operation between the department and Sonera?

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