MIS in local government health care organizations

An integrated actor network and institutional approach

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Abstract

This paper discusses some of the preliminary findings from the field study that I am doing on the development and the use of a computer-based management information system (MIS). Does an artifact like an MIS, when being introduced and put into use, contribute to the creation of a new practice that makes it possible to manage in a different and better way the problem of integration? Or does the MIS only strengthen the ability of the administrative management to dominate others and accordingly only reinforce the existing power relations? The tentative conclusion is that the MIS, as it develops and changes, is inscribed with the values and interests that prevail in the field, but this has happened within the existing power structure.

Keywords: MIS, Actor-network theory, Giddens' structuration theory, institutional theory, organizational practice, power relations.

Introduction

This paper discusses some of the preliminary findings from a field study on the development and use of a management information system (MIS) in Department of Health and Care Services in the City of Trondheim. The research question is: Does an artifact like an MIS, when being introduced and put into use, contribute to the creation of a new practice that makes it possible to manage in a different and better way the problem of integration? Or does the MIS only strengthen the ability of the administrative management to dominate others and accordingly only reinforce the existing power relations? In this paper I am going to investigate these questions by focusing on the changes that have occurred during the development process.

From 1989 to 1993, I worked as an internal consultant at the administrative level in this organization. I had studied theoretical literature about the way decision processes in the public sector unfold and now I had the opportunity to experience and reflect upon what happened in practice. I learned a lot about practical organizational problems and how they are managed in this context. I experienced the well known, but for me, curious gap between what happens in practice and how we think, act, write and talk when making decisions. In this paper, I shall present and analyze such a gap by focusing on a project that has developed a computer-based management information system. There has been a

huge gap between the intentions, plans and actions taken by the administrative management who initiated the project and what was actually happening in practice. This paper documents a complex process with unforeseen problems and outcomes.

There seems to be a rationality in this practice that accords with what Scott (1992) has labeled a rational perspective focusing on clear goals and the formal organizational structure as the means to achieve them. This is not surprising in the context of the administrative level of the organization. This level is placed between the grass-roots level where the services are delivered and the political level where the formal and legitimate right to make decisions is placed. It is part of the normative structure that the administrative leadership has to deal with problems of efficiency and effectiveness. From this perspective the focus on clear goals and formalized means is understandable. However, it seems that this kind of built-in rationality is an ideal that has a life of its own that constrains all the actors. It is an important part of the organizational practice and has an impact on what can legitimately be discussed. This administrative logic and the actors who practice it are situated in a broader context with its political and professional dimensions. In such a context there are other actors equipped with logic of their own. It is well documented in organization theory that a management strategy that relies heavily on the formal structure as the means to manage the organization, encounters its own problems. Vicious circles leading to poor communication between the top level and grass-roots level is but one characteristic. In addition, relying heavily on standardization entails the problems of flexibility. ICT might be an instrument in dealing with these vicious circles. However, it can also be the other way around. A MIS can be inscribed into the existing organizational practice by reinforcing these vicious circles.

The organizational field of practice that we are dealing with here is riddled with institutionalized conflict, ambiguity and uncertainty. Giving care to people is an institutional value where individual rights are at stake. On the other hand, scarce resources must be allocated in accordance with ambiguous criteria of efficiency and effectiveness for the organization as a whole. How do you find a balance between giving a qualitatively good service to some clients and at the same time give help to everyone who needs care? A lot to the few or a little to the many? In addition, there are institutional values about employee participation. But the employees are heterogeneous and represent different values and interests as well.

My perspective is that the development and the use of the MIS is a socio-technical process within which knowledgeable actors are interacting with each other through power relations and are continuously engaged, consciously or unconsciously, in competition about conflicting institutional values and interests prevailing in the field. To understand the development and the use of the MIS we have to take into account that an organizational practice that deals with these dilemmas and contradictions already exists. One has to consider a relational field within which a heterogeneous group of actors each has his legitimate position. These positions give them a certain freedom of action, but at the same time they have to play a collective game in which they collaborate with others and therefore are constrained both by the game itself and the action of others. They also have to defend themselves to maintain their autonomy. In the field that I am studying there is an intricate balance between the freedom of action for the actors at different levels and the games that bind them together, making integration possible.

The paper will be organized as follows: First I will say a few word about the theoretical framework. Secondly, I will present a short description of the formal structure of the local Department of Health and Care Services. Then I will discuss some preliminary interpretations around the development process by focusing on key events.

After that I present some tentative conclusions about how the MIS today does or does not contribute to the problem of integration. I end the paper by presenting what I consider interesting research topics related to my research.

Theoretical framework

Broad theoretical perspectives are needed to understand the processes going on in this context. They must integrate technological dimensions with organized action and its institutional context. Two theories have been applied in the IT-field that, in my view, seem especially promising: actor network theory (applied, for example, by Hanseth and Monteiro, 1995) and Giddens' theory of structuration (applied, for example, by Orlikowski and Robey, 1991). Hanseth and Monteiro claim that the actor network theory is an approach that is able to explain in a more specific and concrete way the development of ICT than Giddens' theory of structuration. On the other hand, Walsham (1997) discusses the possibility of a combination of these two. He states: "A combination of this work (Giddens' structuration theory), and the methodology and concepts of actor-network theory would offer more than either one." I think that is a good idea. In addition, I think there is a need for complementing Giddens' structuration theory and ANT with perspectives that deal with the organizational context more explicitly. An organization is a social construct that already represents a certain «alignment of interests» which is institutionalized. Crozier and Friedberg (1980, p. 53) captures this quite well:

> "[S]tructures and rules have two contradictory aspects. In one sense, at any given moment they are constraints upon all the members of an organization, including the leaders who created them, while in an another sense they are themselves the product of relations of force and of prior bargaining. They are provisional, always contingent institutionalization of the problem of coordination among relative free actors. This solution is given by the actors themselves in the light of the constraints, resources, and negotiating capacities of the moment."

There are similarities between Giddens and Crozier and Friedberg in the sense that both are trying to grasp the relation between actors and structure in a dynamic context. On the other hand they differ in the way Giddens has constructed a grand theory about society in general while the last two authors are concerned about building middle range theories based on empirical investigations. In that sense Crozier and Friedberg might resemble actor-network theory but lack the technological dimension. This paper represents a starting point in trying to combine these perspectives. I do that by using the actor-network theory and the structuration theory as a creative source for identifying possible interpretations while describing key events in the system development process. The discussion will be centered on how the process, as an intermix between developing the MIS and trying to use it, is related to the problem of integrating contradictory values and interests.

Actor network theory (ANT) and Giddens' theory of structuration

According to ANT, humans and non-humans are linked together into actor-networks (Monteiro & Hanseth ibid., p. 331). ANT also assumes that (a section of) society is inhibited by actors pursuing interests and that an actor's interest can be translated into a technical or social arrangement, for instance an IS routine. A basic question it attempts to answer is how a diverse group of actors reaches agreement at all, that is, how a social order establishes a certain degree of stability or exhibits structural properties. According to ANT, stability is the end result of the social process of aligning an initially diverse collection of interests to «one»; acceptance, «truth» or stability. Truth or stability is therefore the result of reaching a certain degree of interest alignment. Accordingly, the focus of such an investigation is on those processes through which «socio-technical» networks are (or fail to be) created, sustained and dismantled.

The aim of structuration theory is to account for the interplay between human action and social structure (Giddens, 1981; Orlikowski, 1991; Monteiro and Hanseth, 1996, p.328). The concept of structure is to be understood as an abstract property of a concrete social system, for instance an organization. The two key elements of structuration theory are the following: (i) the manner in which the two levels of action and structures are captured through the duality of structure, and (ii) the identification of modalities as the vehicle, which links the two levels. It is important to note the dynamic character of such a relation. Institutionalized practices are created by humans, which in turn are constrained by these institutionalized practices. Further, these practices are maintained by humans who reproduce them and eventually change them. There are three modalities: interpretive schemes, resources and norms. Interpretive schemes deal with how actors understand and how this understanding is exhibited. It denotes the shared stock of knowledge that humans draw upon when interpreting situations. Resources comprise the media through which power is exercised by the actors and on the institutional level it designates a structure of domination. Norms are organizational rules or conventions governing legitimate or appropriate conduct.

The formal organization - a preliminary description

Here I can only give a simplified description of the formal organizational structure. In reality it is very complicated and from the time the MIS was initiated (1987) and till today there have been several reorganizations. At the top level of the municipality there is, of course, the political (elected members') level, consisting mainly of a municipal council, an executive board, and the chairman of the municipal council. In this paper I will not go into this level. Nor will I treat in any depth the top administrative level of the municipality as a whole. Both of these levels will in the study be treated as part of the context, but this paper would be too extensive if a description should be included. Therefore, I will exclusively focus on the administrative- and the grass-roots level of the local Department of Health and Care.

Heading the Department of Health and Care, is the administrative leader with his staff, who is dealing with planning, economic and personal matters. The level below consists of six districts. The managers within each district are responsible for the production of health and care services in their respective geographical area. These

administrative levels are in a way autonomous and integrated units (divisions) equipped with the necessary administrative resources to manage the delivery of services in their respective areas.

Within each district there are many different types of services and the structure is complicated. Therefore, I concentrate on the types of services, which are directly related to the development and use of the MIS. The MIS is primarily connected to two types of service delivery, services delivered in people's own homes (home-based services) being one type, whereas the other type is the so-called institutionally based services. This means that the client has to leave his/her own home and move permanently to a nursing home. There is one leader in charge of both of these services. The unit is labeled the Care Unit

The level below consists of the grassroots-leaders, who are responsible for their respective units within a health-care hospital or a geographical area in the home-based services. There are many different professions involved in the production of the health and care services, but not all of them are staff within the Care Unit. For instance doctors, physiotherapists, ergonomists and psychiatric nurses belong to another administrative unit in each district, which is called the Health-unit. The staff within the unit labeled the Care-unit is primarily nurses, assistant nurses and staff with no professional training, who are called «home helpers».

This simplified description is primarily concerned with the formal organizational structure. Such a structure has come into being through a process and must be considered as a social construct. As such it has formal and technical attributes such as official goals, division of labor, authority structure, formal qualifications for employees and other technical specifications. In addition, it can also be described by institutional traits such as organizational principles and espoused values. This represents the «objectively» defined context where the actors in the field under study are embedded and within which the development and use of the MIS goes on. In Giddens' theory the above context represents input into the actors' meaningful behavior by defining a system of domination. It partly denotes a stock of knowledge that humans draw upon when interpreting situations. And the context consists of norms, which are organizational rules or conventions governing legitimate or appropriate conduct. But I must go further and ask: What are the actors actually doing within the relational structure they are involved in? In this respect the goal of the investigation is to understand these relations by trying to uncover the games the actors are involved in, when they are pursuing their own interests and at the same time contributing to the construction of the MIS as a collective effort (Crozier and Friedberg, 1980).

The development of the computer based management information system

The story is primarily based on interviews with key actors, documents and my own experience from the time I worked in the organization as an internal consultant. Obviously, there is a danger that my own experience will bias the discussion. This is a problem that I will not discuss in this paper. I just want to say that a test of the «objectivity» rests heavily on the way I handle the relation between theory and the way I capture what is actually going on in the field of practice.

The initial phase

In 1986 the administrative leader of the Office of Nursing and Care[1] initiated a management project based on the ideas from Management by Objectives. Developing a computer based management information system became an important part of this project. The reasons put forward were based on the observation that there was almost a total absence of valid data about the production of services. The administrative leader felt it was difficult to understand in concrete terms the actual need for resources in the different part of the organization. The arguments put forward were to a great extent based on each leader's subjective impressions of the situation and were rather vague.

There was also an argument at a more general level. Managing in accordance with the principle of MBO was considered impossible without valid information about the use of resources as a prerequisite for evaluating goal achievement. The rhetoric surrounding the project was rooted in the usefulness of a «planning rationality». The project leader, an external consultant, argued that at the grassroots level the actors were too embedded in an individualistic «care-rationality» with a too narrow focus on the means, for example what kinds of services are given to each client and not concerned about goal achievement in a broader sense. Therefore, the argument goes, the individualistic «care rationality» must be complemented with a «planning rationality» (Forseth, 1989).

The data-program was constructed to make it possible to classify the client's level of functionality, what kinds of services he/she is getting, possible improvement, gap between what is actually delivered of services and what the client gets and so on. In that respect a classification scheme was constructed in such a way that it could be built into a computer program. In addition, a software program and a database were built which could handle the data statistically at an aggregated level. The aggregated data should then be used as input in the decision process concerning allocation of resources and in the future also make it possible to assess goal attainment.

Orlikowski (1991, p. 153) points to the fact that the content and form of an IT artifact tend to reflect the assumptions and objectives of its designers. It is rather obvious in this case that the system reflects an administrative logic, forcefully expressed by a charismatic leader[2]. Because of that he has also been rather controversial. As a former researcher within the field of geriatrics he carried out an empirical investigation to see how several municipalities in one county spent their economic resources on different kinds of services. When I interviewed him he confirmed that the method he developed in that investigation represented the frame of reference for MIS. Worth mentioning too is that the project leader for the MBO-project was a former colleague of the director of the department. They had also previously worked together at The Institute for Norwegian Hospital Research. Accordingly, in addition to reflection and administrative «interest», it also included a scientific approach to «how to run the business».

The MIS can be seen as an attempt to use ICT strategically. The main strategic issue in this field is about the allocation of resources between the home-based services

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[1] In 1986 the office was named The Office of Nurse and Care and was rather small in size. It was primarily dealing with service delivery in the home-based services. Later, as we shall see, two public reforms transformed the department dramatically with respect to size. First, in 1987, the hospital-care reform and second the reform for the care of the mental retarded in 1991. Both of these services which formerly were governed by the county were now moved to the local governmental level.

[2] The administrative leader has a reputation for being good at articulating in a convincing way what he considers the best way to develop the organization.

and services given in the institutions. The trend is to give priority to the home-based services at the expense of the institutions, the idea being that such a strategy is contributing both to better service quality to each client and to the most effective use of the resources at the organizational level.

But it is hard to document this strategy scientifically. The MIS was therefore to be an instrument to provide the management with a knowledge base that could support this strategy. But this turned out to be a black box. It is like trying to use the system before it is developed. One aspect of the ANT is that an actor's interest can be translated into a technical or social arrangement, for instance an IS routine. Further, stability is seen as the end result of the social process of aligning an initially diverse collection of interests to «one»; acceptance, «truth» or stability. Truth or stability is the result of reaching a certain degree of alignment of interest (Callon, 1991). In my case this can be interpreted as the administrative leader's effort to inscribe his interest in managing the department in a certain way through the creation of an IS-routine, which would enable such an objective. But, according to the ANT this has to be done through the alignment of an initially diverse collection of interests. Another important «interest» in this context is those expressed by the nursing profession. There are also other actors with their interests but it is the nurses who are in a dominant position. It is mostly from this profession that the leaders are recruited. So the creation of the MIS has to be aligned, through a process of negotiation, with the interests of the nurses. The construction of the data-based classification scheme is relevant in that respect.

In the MBO project, although it can be characterized as a top-down project, there was also a rather high degree of participation from the grass-roots level. In the construction of the classification scheme several actors got involved from different parts of the organization and different professions. To make the story short, they did not make much progress, so the administrative management decided to import an already developed scheme and adjust it to fit the requirement of a software program. The actors at the grass-roots level felt «manipulated» feeling that their involvement was a kind of «play» (Forseth, 1989). How do we interpret such a process of «negotiation»?

Traditionally, there has been very little formalization of work routines in this setting. Explicit knowledge has been less dominant than «tacit» knowledge. In that respect, constructing a classification scheme involves a process by which the «tacit» knowledge is somehow translated into explicit knowledge (Nonaka and Takeuchi 1995). In Giddens' terminology this means creating new interpretive schemes. But, this has to be done within the existing structure of domination and the resources available by the actors. There seems to be a gap here between the way the problem is framed by the administration and the way the problem solving process actually unfolds at the grass-roots level. I do not think that this is only a question about differences in interests. It can also be viewed as a case where one actor (the administration) has an articulated interest while the actors at the grass-roots level had no idea of what it was about at all. That the administrative leader stopped the project and imported a classification scheme from outside, is a legitimate way to handle the case in such a context. Accordingly, this can be understood in the light of structuration theory. The administration had an upper hand in the game both concerning resources as it is defined by the structure of domination and the structure of legitimization. This can also be interpreted as a strategy used by the administrative leader to strengthen his control over «his organization» but his freedom of action was more restricted than anticipated. This became clear when the MIS was being implemented.

Using the system

Technically the system was based on isolated personal computers. Here I will not go any further into the technical aspect of the system. After the system was installed at the grass-roots level the gap between what the leader of the Care Unit expected and what actually happened in practice soon materialized. It became rather obvious that the actors at the grass-roots level, both leaders and employees did not show much interest in using the system. During the years to come several initiatives were taken by the administrative leader to make the system work. There was some progress, but still rather poor results. The administrative leader says the following: «The system survived thanks to some key actors who believed in it». But it turned out to be a very poor management instrument compared to the expectations at the outset. These expectations were something like «push the button» and the necessary information would materialize.

A central concept within ANT is «inscription». It refers to the process whereby for instance an IT artifact becomes an integrated element in an aligned network. Obviously, the MIS we are treating here did not become an element in such a network. One can say that a bargain between the administrative and the professional actors involved could not be reached to any degree. The lesson to be learned was that a precondition for using it as a management instrument was that the actors at the grassroots level did their part of the job. Also, the management at intermediate level felt rather insecure as to how to handle the new system.

In my view this is not satisfactory. I believe it is constructive to analyze the set of problems from an institutional perspective. New interpretive schemes have to be invented, but that must be done within the existing structure of signification, domination and legitimization. One strong feature of the ANT is to focus on the process of negotiation in reaching an alignment of interests by establishing a socio-technical network. On the other hand, the structuration theory points to the relation between the actors and the institutional context in which they operate in the negotiation process. One can say that the institutional values and interests that the administrative leadership tried to inscribe were too biased towards their own logic as far as efficiency and effectiveness were concerned, and relied too much on the formal authority given to them by the overall institutional system. On the other hand it did not work because the actors were unsuccessful in creating a new practice that could handle the prevailing contradictory values and interests. It was too concerned with getting quantitative data about the organization as a production entity and not enough concerned with the problem of creating a new practice, which in a more constructive way would be able to handle the relations between the administrative leadership and the actors at the grass-roots level.

Developing the system

In 1987 a public reform was implemented in Norway, where the care-services in institutions were moved from the jurisdiction of the county to the local governmental level. About twenty institutions of various sizes became a part of the organization and the department grew considerably in size. In 1989 (October), in spite of the slow progress, the administrative leader decided to implement the MIS in these institutions as well. A nurse with management experience got the job of giving the necessary training to the staff. She soon realized that the actors in these institutions did not give priority to or show any motivation in using the program. After she had worked with the project for some time she realized that if the staff were to use the program they had to feel that it was

useful for them when doing their own work. As it was now, she claimed, the actors felt they were doing a job for others. The categories in the classification scheme were also unsatisfactory.

In the summer of 1990 an evaluation group was set up. The mandate of this group was to consider how the system could be improved and/or the possibilities of expanding the range of application. This started a discussion about how to develop the system. After considering different alternatives the conclusion was to develop a new program based on the existing one and to complement it with another one developed in another city in Norway. That program was constructed as a tool for managing the day to day work at the grassroots level. It included software programs for personnel planning and work coordination, report writing and so on. A project group was established and a contract was signed with the same IT-company that had developed the administrative program that was to complement the one that was already there. The «NITPRO» project was born. Formally it started February 1991.

At the same time the leadership of the whole municipal organization, started a reorganization process, both politically and administratively. They also started an offensive with respect to IT by introducing a network technology. A contract was made with an IT-firm (Telenor) that was to provide the organization with hardware and a specified set of software. This was an event that changed the possibility for developing the MIS. To develop the NITPRO two persons got a full time job in the project. One of them was the same nurse that previously had tried to implement the system in the nursing homes. She was appointed project leader. The other person was equipped with some technical competence. Their main responsibility was to develop the program in cooperation with the IT-firm. They were also to plan and design a pilot project with the aim of testing the system in one of the districts. This included an educational program for those actors who were to participate in the pilot project and a plan for installing the hardware.

At the outset a cost-benefit analysis was worked out. The following objectives were formulated: Improved quality, better services to the clients, improved and faster management data, a more goal oriented use of the nurses' expertise and rationalization of administrative work. The document was held in a rather optimistic tone. It stipulated a cost reduction of 56 jobs a year. In retrospect this did not materialize. I also have to mention that in the process the program developed as a part of the development of a statistical program on the national level. This program which is named GERIX was based on the program that came into being in Trondheim but now with the ambition of being used as a standardized program for the whole nation.

In the ANT particular attention is paid to the key role played by various intermediaries in the (always-provisional) construction and stabilization of networks. Intermediaries constitute the means for bringing together (or keeping apart) various heterogeneous entities, thereby constructing the form and the substance between them. In the context of the development and use of MIS, this includes everything and everyone (management, consultants, commentators, manuals, development methodologies, and so on) deployed as part of an attempt to ensure the optimal integration or mixture of «technical» and «social/organizational elements (Blomfield & Burdubakis, 1997, p. 87).

The project leader turned out to play an important role in the development process. She can be considered an intermediary negotiating between the actors at administrative level and the professionals at the grass-roots level. The same can be said about the cost-benefit report. By focusing both on efficiency and quality a symbolic «negotiation» was made. Today this report is considered a strategic document.

The Pilot project

The pilot project got a bad start. The necessary equipment did not arrive as planned and hence the possibility for training the participants in the pilot project could not be done properly. Even after the equipment had arrived the problem continued. When interviewing the project leader she said that the leaders did not have sufficient knowledge about the program's objectives. Another problem that soon materialized was the lack of existing routines concerning the updating of information about the clients situation. Accordingly, this problem had to be dealt with at the same time as the system was tested out. In evaluating the project the employees and leaders who participated complained about the domination of technical issues at the expense of professional issues. A rather straightforward conclusion was that the project required much more resources than expected and that the time schedule was unrealistic.

The project leader (the nurse), quit her job after she had tried to implement the system with the same «methodology» in another unit in the district. Her reason was that she felt that she encountered the same problems as in the first unit despite the improvement of the system. Her conclusion was as she stated it: «A project like this has to be developed within the existing line of authority». So, what started out as an implementation based on an adaptive strategy did not succeed to any degree (Berman, 1978). As we shall see this resulted in a «new way» of organizing the development process based on a programmed strategy of implementation. How to interpret this change of strategy? I will not elaborate on this issue here. I just want to suggest that it cannot be seen only as an expression of the conflict of interests and values that prevail in this field of practice. It is also a demonstration of how such conflicts are managed as institutionalized ways of handling them. It can be seen as a bureaucratic management strategy.

The project did not fail. The outcome of the process was a new program with a form and substance that to a certain extent accorded with the needs of the leaders at the grass-roots level. Several actors were starting to talk about it as a professional data based information system. Within ANT this can be interpreted as a negotiation process. The project leader played an important role as an intermediary or a gatekeeper between the administrative practice with their focus on rational planning and efficiency, and the requirements of a practical program that could enable the coordination of work at the grass-roots level. Still, the professionals at the grass-roots level did complain that there was too much emphasis on the technical requirements and too little on professional issues.

IT «Organization» emerges

Obviously, the project turned out to be much more complex and dynamic then the actors imagined beforehand. The problems were at the same time both technical and social. Accordingly, the pilot project turned out to be a complex mix between constructing the system and using it. In the web of this «collapse» the administrative leadership rethought the development process. A comprehensive educational program was developed aiming at implementing the system stepwise in each district. In the same period a new structure grew up. It consisted of appointed coordinators (later called super users) in each district. A centralized coordinating group at the top administrative level was established. In order to link these two levels a feedback system was established, making it possible to inform the coordinating group about problems in the system. In order to link these two levels, an

operative unit, consisting of two persons, was established. This unit became a permanent part of the Director's staff. So, the inscription process continues at different levels of the organization. Relatively many actors are using the system. 200 employees can be logged on to the system at the same time during the day.

Tentative conclusions and future research

The computer-based management system started out as a an information system that was to produce data about the clients' situation, data which in turn were to be aggregated, analyzed statistically and then used as input in the decision processes concerning the allocation of resources. During the process the program has been developed so it now also includes a whole range of sub-programs related to the day to day operation and professional planning on the grass-roots level. Today it is described as a professional data based information program.

The pattern that emerges is that during the process the use of the system is to a certain extent inscribed as a planning instrument at the top administrative level and as an administrative system at the grass-roots level. At the grass-roots level both leaders and employees are partly dependent on the system because it has replaced existing routines. On the other hand there seem to be difficulties in creating a network in which the professional module is inscribed. There is also a curious lack of involvement from the intermediate management level, both in the development process and in their interest in using the data as a planning instrument. When it comes to the component of the program, which includes the classification of clients, there are still problems. I think it is reasonable to say that it is this component of the program that works less well and which is the most controversial. Although the administration at the top level has started to use the available statistical data to estimate the use of resources this is not a straightforward problem. Mathematical models and new categorizations must be constructed in accordance with the characteristics of the field.

My tentative conclusion is that the MIS during the development process has been adapted to the values and interests that prevail in field. The actors are busy creating the MIS. Their main problem is how to integrate it into the existing organizational practice. In that respect they have difficulties documenting any effects as far as efficiency and effectiveness are concerned. During the development process the system has split up. One is trying to is use it as a strategic tool at the top administrative level. Second, it is used as an administrative tool at the grass-roots level. And third, one is trying to use it as a professional tool. However the main actors, the nurses, seem reluctant to use it. One way or another, values and interests are in different ways and to different degrees inscribed into the system. In that respect I claim that this is done by separation and not by integrating different values and interests. The lack of involvement from the middle managers and the problem of using it as a professional planning instrument support this. They are important intermediaries facing the problem of integrating contradictory values. Efficiency and effectiveness with its focus on qualitative measures is one institutionalized value. Another is the expectation to deliver a qualitatively good service to the individual who needs care.

Being rather pessimistic one can state that the distance and poor communication between the grass-roots level and the top administrative level so common in bureaucratic organization continue. This is reflected in the content and the structure of the MIS itself, due to its bias towards the administrative logic discussed in the introduction. For

instance the professional planning program rests heavily on the rationality that prevails in the theory of management by objectives and not by the professional standards in the nursing profession. On the other hand it is hard to see any change in the way contradictory values and interests are handled. Of course this has to be investigated further. My next step in the investigation will be to focus on the role of the middle managers in the process. What kinds of problems do they have to deal with in negotiating the administrative and professional values and interests?

The MIS is an innovation in the sense that the MIS was developed from scratch. Although there has been one main entrepreneur, different actors and ideas were brought together in new ways combining different technologies. As an innovation it is a system that is closely related to the strategy process that is going on and therefore it can be characterized as a strategic use of ICT (Knights, Noble and Willmott, 1997). This research can provide insight into how to use ICT strategically in the public sector.

The MIS is all-embracing; to function the actors at different levels of the organization must be involved. In that respect it can also be viewed as a knowledge creating process (Nonaka and Takeuchi, 1995) involving a transformation from tacit to explicit knowledge on the one hand, and on the other it can be viewed as creating new knowledge by trying to construct models that make it possible to combine in new ways the explicit knowledge created by the MIS. Accordingly, this research can contribute to an understanding of how such a knowledge creating process unfolds. In that respect the concept of knowledge has to be broadened, including also knowledge creation concerning how to deal with conflicting values and interests. Creating knowledge about how to cooperate is a great challenge in such a context. Research within the field of computer based cooperative design is therefore also relevant.

References

Bermann, P. The Study of Macro and Micro implementation. Public Policy 26(2), 1978.

Bloomfield, B. P. and Vurdubakis, T. Paper Traces: Inscribing Organizations and Information Technology. In B. P. Bloomfield, R Coombs, D. Nights and D. Litter (Editors), Information Technology and Organizations, Strategies, Networks, and Integration, Oxford University Press, 1997.

Crozier, M. and E. Friedberg: Actors and Systems. The Politics of Collective Action. Chicago: The University of Chicago Press, 1977, 1980.

Forseth, U. Uten mål og mening? Målstyring av omsorgstjenesten i Trondheim. Norsk institutt for sykehusforskning. Rapport 6/1989.

Giddens, A. Agency, institution, and time-space analysis. In Advances in social theory and methodology. Routledge & Kegan, Boston, London and Henley, 1981, pp. 161-174.

Orlikowski, W.J., and Robey, D. Information Technology and the Structuring of Organizations. Information Systems Research, 2, 1991, pp. 143-169

Monteiro, E, and Hanseth, O. Social Shaping of Information Infrastructure: On Being Specific about the Technology. In W.J. Orlikowski, G. Walsham, M.R. Jones and J.I. De Gross (Editors), Information Technology and Changes in Organizational Work. London: Chapman & Hall, 1996.

Scott: R. Organization - Rational, Natural and Open Systems. Prentice Hall Inc., 1992.

Walsham, G. Actor-Network Theory and IS Research: Current Status and Future Prospects. The Judge Institute of Management Studies, University of Cambridge, 1997