Health Data Network: Organizational and Political Challenges

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Abstract

This paper reports on the implementation of a Danish health data network developed at a county level (Fuen) linking the various actors in the health sector. It provides an overview of organizational and technology use issues encountered in such an implementation. The network involves so far EDI (letter of discharge, test results, bills, etc.) and access to waiting lists at the hospital. The participants include about 75% of the GPs, the pharmacies, the health insurance and the hospitals. The future plans for the network includes expansion of the network to additional areas in the health sector, as well as new functional items, such as medical records. At a national scale, aims are to link all counties in a national health data network.

Using a framework adopted from Andersen and Danziger (1995), our study show that there are benefits in terms of the capabilities and the interaction among the actors involved [2]. Also, the increased reliance on computerized information has improved the service in the health sector. However, improvements of each of these three variables are in part a compromise (trade off) with privacy issues not only in terms of patients’ privacy and protection of legal rights, but also the doctors’ concept of “professional privacy” pose challenges to the potential expansion of health data network.

1. INTRODUCTION

Denmark is among the most informed First World countries and has in particular been recognized for the advanced use of information systems (IS) in the public sector. Having equipped all governmental offices and personnel with local area network (LAN) and personal computers (PCs), the Danish public sector is driving towards the next stage in informatization with widespread intra- and internet use, and electronic archiving and case handling. Less frequent is electronic handling of incoming and outgoing correspondence and electronic data interchange (EDI) in areas such as public procurement [1, 4]. Employing about one-third of the labor force and re-allocating about two-thirds of the annual GDP, it is of immense importance for the Danish economy to use IS to enhance allocation of the resources in both the private and the public sector. Also, the public sector needs to be transparent and responsive to citizens' ever changing preferences in order to continue to gain support and legitimization. Snellen (1997) has summarized the challenges for informing the local government to encompass the cost optimum, the service optimum, and the democratic optimum [16]. No where is this more true than in the health sector.

The health sector is worldwide receiving high policy attention [14] and it is accordingly often addressed whether IS can be used to boost effectiveness and efficiency in this sector [12]. The organization and use of IS in the health sector reflects in many aspects the general impacts and challenges the public sector face in Denmark in its transition towards the next millenium. The health sector is financed through taxation but has contracted out most of its services to private GPs and specialists and introduced competition among the county owned hospitals. Furthermore, the pharmacies are private owned and operates on a competitive level. The Danish counties are each responsible for the regional health service and having its own taxation for, among others, such purpose. In this paper we report on a health data network developed at a county level (Fuen) linking the various actors in the health sector. It is a heated debate whether investments in IT leads to higher productivity within the health care sector. A recent study by Menon, Lee, and Eldenberg (1996) finds that during the past sixteen years, investments in IT have had a positive contribution on the production of services in the health care sector [13]. By contrast, Ribbers (1995) finds that “The strength of EDI in the health care environment is not primarily cost reduction but quality improvement of data and data transfer” (p. 260) [15].

Applying a four dimensional framework adopted from Andersen and Danziger (1995), our study show that there
are benefits deriving from the network with improved capabilities and better interaction among the actors [2]. Also, the increased reliance on computerized information has improved the services in the health sector. However, improvements of each of these three variables are a compromise (trade off) with concept of privacy in terms of patients' privacy and protection of legal rights. Also, the doctors' concept of “professional privacy” pose challenges to the potential expansion of health data network.

2. OUR FRAMEWORK

At the general level, this paper is concerned with information systems and the political world. The specific example of IS analyzed in this paper is EDI along with other types of IOS. Classical themes addressed in using EDI and IOS is the diffusion process, can IS be used to reengineer the public sector, is the use of EDI restricting rather enhancing trade, and what are the impacts of using EDI on the business world [1, 3]. In this paper we, as stated above, interested in a quite other angle, namely the interaction between IS and the political world.

Concerns in any country are whether voice mail and web based tax form improve tax collection, does safety increase because of the police patrolling information systems, does computerized traffic control systems loosen traffic congestion, does the electronic city hall favor certain citizens over others, are politicians and their economic advisors and their computerized models an evil alliance trying to outnumber or rule the country, rather than letting the people voice raise. These concerns are classical discussions and the object for many surveys and studies of the public administration worldwide. Similar, the use of computers and communication technologies in the public administration have been discussed from such perspectives as: does the use of computers lead to increased efficiency and effectiveness; is the interaction changed and --more important-- improved or do we just allow more information to be processed; does the use of computerized data lead to exclusion of less educated citizens from understanding what is going on in the decision-making process and in turn give their democratic vote; and does the massive collection of data in part enabled by the use of computing hardware and software programs, lead to invasion of privacy and violation of citizens and employees rights to privacy. These concerns reflect the four variables we are concerned with in this paper: the capability of the political actors, the interaction between the actors, the orientation of the decision-making process, and the value distribution in society.

Capabilities denote the manner in which the unit manages its environment, to control the effects of the environment on its behavior and to extract values from the environment (e.g., work productivity, effectiveness of service provision, policy performance); (2) interactions denote the manner in which the political unit organizes its actions and then acts in relation to other units (e.g., responsiveness to citizens, power exercise, interorganizational coordination); (3) orientations are the configuration of affective, cognitive and evaluative considerations that the unit employs is attributing value, establishing preferences, and making choices (e.g., political knowledge, ideological beliefs, cognitive style); and (4) value distributions denote the extent to which the unit experiences positive and negative allocations of things that are valued (e.g., power, economic resources, status, privacy, security).

In a comprehensive survey on IS in First World government, Andersen and Danziger`s main conclusions were that the “...body of empirical analyses presents a mixed, but generally positive characterization of the impacts of information technology on politics and the public sector. The positive impacts of IT on politics are reported most frequently on capabilities, especially on the efficiency benefits. Impacts are also generally favorable on the effectiveness measures, although there are some instances where no notable effects of IT are identified. Information quality is also enhanced, according to most of the studies, although it is perhaps surprising that negative impacts are reported for about 20 percent of the measures. It is worth noting that these negative impacts were always part of a mixed set of effects -- that is, every study which reported negative impacts also reported positive impacts in the same category of information quality. And among the few interaction impacts that were identified, about half were positive, while the rest were negative or instances where no notable effects were discerned.”

Andersen and Danziger also found that the most clearly negative impacts of IT were on values. In many instances, the empirical studies identified unfavorable impacts of IT on individuals' privacy, legal rights and job enhancement (although positive effects on jobs are considerably more frequent than negative ones). While the impacts on values were not overwhelmingly negative, these studies raised their most serious questions about the role of information technology on politics in their assessment of value distribution at the individual level.
Table 1. The Framework

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indicators</th>
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<tbody>
<tr>
<td>Capability</td>
<td>Information quality: the effects of IT on the accessibility and quality of information and data Efficiency: the capacity of actors to complete work with a more favorable ratio of outputs to input resources (of time, staff, costs); Effectiveness: the actors’ capacity to achieve their goals and the quality of their actions.</td>
</tr>
<tr>
<td>Interaction</td>
<td>Effects on the relations among actors, including interunit coordination, the exercise of power and authority, and citizen-government linkages.</td>
</tr>
<tr>
<td>Political</td>
<td>Impacts on orientations, centers in the emphasis on quantitative versus qualitative decision making criteria</td>
</tr>
<tr>
<td>orientation</td>
<td></td>
</tr>
<tr>
<td>Value distribution</td>
<td>Changes in the distribution of particular conditions of public and private life and work, such as privacy, job quality, and protection of legal rights.</td>
</tr>
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</table>

3. THE HEALTH SECTOR

During the 1970s and 1980s a substantial literature within the MIS-field addressed the rationale behind the perpetual development of information systems (IS) despite the rarely successful attempts to implement IS in the public sector. In fact, it was obvious that many of the attempts to computerize the public sector failed. In Denmark as elsewhere. Nevertheless, computerization, as witnessed in its role in tax administration and social security, made it possible for the tasks in the public sector in most first world countries to be carried out in practice. Organizations as the Kommunedata organization in Denmark and Sweden paved the road for the high computerization of local government that administrated the Danish welfare state: both its services and the tax collection.

In our policy sector, the health sector, computerization of the administration was however not very advanced and is still not at a comparable level to the rest of the public sector. Entering a hospital in Denmark one is at the one hand amazed by the technological level of the equipment used by doctors and specialists. Yet, one still see doctors with paper sheets and cardiograms hanging with hand written marks on. It is not that the dreams of IS has been absent: IS has long been seen as a catalyst for solving the typical paradox of empty beds at one hospital and patients lined up on the waiting list at the hospital across the street. And for transmitting health insurance documents back and forth faster, more reliable, and less time consuming to re-enter the data.

During the late 1980s and early 1990s extensive literature on EDI in health sector surfaced. The literature did not so much address the technical problems per se or the problems with computers. Rather the focus was shifted on how to use them inter- and intraorganizationally. EDI was seen as a means to wire organizations in policy areas such as the health care industries. Since then, a massive development in the application and communication channels and improved user ability has emerged. EDI is now regarded as the simple form of communication between organizations and individuals. Focus zeros in on sharing transactions, systems access, process integration and knowledge network.

Consequently, the Danish national government has launched plans for electronic patient record and national health data network. On the long run, benefits are expected on variables such as:
- increased and better information to the patients
- more efficient resource allocation within the health sector
- improved quality of the services
- more accurate information on effects of treatment

As part of the national governmental strategy to informate the public sector, ten cutting edge projects at the local levels of government has been appointed. The health data network in Fuen has been appointed as one of them. Furthermore, the Ministry of Health has simultaneously started the development of a national health data network (MedCom) [8].

In 1992, Fuen County initiated the development of the Fuen health data network. Communication was established via an electronic mailbox wiring hospitals, general practitioners (GPs), pharmacies, and the regional health insurance. The health data network involves communication with letters of discharge from hospitals to
GPs, laboratory and radiology reports to the GPs, prescriptions from GPs to pharmacies, current information on the occupancies of the hospital departments, waiting lists, treatment procedures etc. from the hospitals to the GPs, reimbursement forms from the GPs and pharmacies to the regional health insurance, and medical information from the wholesale suppliers to the pharmacies/doctors. The communication follows the Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT) developed by the UN and approved by the International Standards Organization (IOS) and Comite European de Normalisation (CEN).

Currently the technology chosen in the network does not involve transmission of graphics (such as X-rays). Most of the users connect to the network via modem. Only a small fraction uses ISDN-connection. A general information system (VISINFO) is, however, only provided on a monthly updated diskette. This means of communication was decided with consideration for the high cost of updating the system through the network data. In the network, the files contain typical structured and free form entries. Moving in the direction of increased standardization for example as seen in letters of discharge with specific information such as drugs prescribed the demand for the capacity of the network has been increased remarkably since it started. The European standard, MedDis, has now been incorporated making it possible to use standardized data forms for drug and laboratory responses. While this might have overall benefits for the network, very large data files to fill out, whereas previously the files were in free-form format thwart the pharmaceutical drug industry (wholesalers).

The network is constructed with only one central mailbox, allowing each user of the network access to the network. The stated goal of the initiative back in 1990 was to:

• improve the communication between the different parts of the health care sector
• increase in the speed and accuracy of information retrieval and communication in general
• improve the quality of the treatment and the service for patients

The budget for developing the network amounts to a total of 1.5 million DKK per year (approx. 250,000 USD). The following organizations and actors use the network: central health service administration, all wards in the ten hospitals in Fuen, the eight largest clinical hospitals in Fuen, the Danish National Serum Institute, the Danish National Institute of Pathology, 139 doctors’ practices in Fuen (of a total of 179), 28 pharmacies in Fuen (of a potential of 32), and 19 doctors’ practices in Southern Jutland County. The hospitals, GPs and specialists are mainly serving the about 468,000 citizens living in Fuen county [6].

During the 1990s, the general health reform in Denmark has provided the possibilities for citizens to choose whatever hospital they want to use across county borders. Thus, money is no longer following the hospitals but the patients. One of the expected outcomes of these reforms was to increase incentives to increase efficiency at the hospitals. Facing an aging population and the competition introduced, attention to using information technology to increase both effectiveness and efficiency seems crucial. For example, from 1995 to 2005, the age groups 0-15, and 60+ are all expected to increase. By contract to the increase in the "net-cost groups", the "net-taxpayer" group in the age group from age 16 to 59 years is declining.

It is notable that a doctor’s practice on average employs 1.8 doctors, though it may vary from one to five doctors. At some hospitals, electronic patient records have been developed. A far larger fraction of the doctors’ practices has, however, implemented electronic patient journals. In most practices no nurses and a very few number of doctors are employed. By contrast, at hospitals, both nurses and doctors are employed. Thus, the users of the electronic patient journals at the hospitals differ substantially in capabilities and in their need for information. In fact, electronic patient records are so far not part of the health data network.
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5. ACCESSING THE IMPACTS
The measurable effects of data network such as the Fuen data network often disappear. This might be a result of not having clear goals within a network, conflicting goals, hardly measurable goals, or unwillingness on the part of the actors to report and thereby validate the results. However, by the end of 1995, a noticeable success could be seen when measured by the number of users of the network and the managerial benefits achieved.

As regard to the technical aspects, the users of the network were asked to rank the degree of overall user friendly features of the network. In total 18 respondents in the doctor’s practices, 20 respondents in the clinical departments in the hospitals and 6 in the laboratories responded. In general, the network was found easy to use but facilities such as entries and text-manipulation were found unsatisfactory. One of the expected outcomes from the network was a reduction in telephone and mail costs for the doctors’ practices. However, only one doctors’ practice found this to be true. Similar findings are revealed at the pharmacies and the hospitals. Part of the explanation for the unfulfilled expectations is the general increase in communication, thus causing an increased use of the same communication tools. Some doctors do claim, however, that the total hardware, software and communication costs exceed their financial capabilities.

After establishing the computerized health data network within the organization, the county estimated that substantial revenue had been achieved [8]. There is however, major variance in how much of the communication is wired. Twenty-seven percent of the letters of discharge are computerized and are part of a network in Fuen County. At the national level, only 10 percent of the letters of discharge are part of a network.

Most remarkable of all is probably that almost 80 percent of the laboratories send and receive their messages through electronic communication at Fuen County, whereas at the national level, on average only 20 percent of the communication in the labs are processed electronically. Furthermore, more than 4 out of 5 pharmacies are wired. This is true for Fuen County as well as the national average.

Quick laboratory response is critical for increasing or expanding the number of patients treated, such as the case for adjusting the medication for diabetics. Though our data show mixed impacts on the networks’ impact on timely laboratory response, it must also be kept in mind, that the incentive to report major impact on faster treatment etc. can be underestimated because of financial motives. As we know, the doctors’ practices receive payment from the general health insurance. If they were to report major time reductions, the standard fees for the treatment of each patient might be reduced accordingly. A clearer impact can be identified when the question is rephrased and asks about time reduction in handling laboratory responses and letters of discharge. Here we witness time reductions up to an average of five minutes for receiving letters of discharge.

About 30 percent of the doctors’ practices in Fuen County still use paper based patient records. Moreover, they do not use electronic communication at all with the municipalities, pharmacies and hospitals. Despite these handicaps, the number of GPs connected to the network has soared during the period 1993-1996. Also, distributed by types of communication (letter of discharge, x-ray, microbiology, cytology, clinical chemical, etc.), the use of the network in Fuen County has expanded during the period 1993-1996.

For the hospitals and pharmacies, this implies that they have to use both paper based and electronic filing systems. While this has not made any difference for the practices that are wired, the net-benefit for the hospital and others has been low or even counter-productive due to the double-administration. In addition, the reason for not using computers in the doctors’ practice is often explained by economic and professional arguments, rather than technical or unfamiliarity issues. Though the economic resources for developing the network is claimed to be sufficient, funding for transferring from one system to another might have slowed down the implementation process.

Before the network was established, the status of the computer facilities at the doctors’ practices, the clinical departments at the hospitals and the laboratories were surveyed. Within the doctors’ practices, about half of the respondents reported that they have used computers in their correspondence with national health insurance less than six months prior to the time that the connection to the network was established. The other half used it for more than six months. Yet, about two-thirds of the doctors have had electronic patient records more than six months prior to using the health data network.

Though this indicates a difference in technical abilities, a perhaps greater variance exists in classification and standardization of coding of the work. Within public administration literature, emphasis has been made about
the autonomy of the actors and the street-level workers. Health care involves quite a number of street level workers, such as home nurses and cleaning staff that clean sick persons’ homes if they are being taken care of there, instead of at the hospitals.

Home nurses are of most interest here. Currently, experiments are conducted with this group, though not yet fully included in the network. Some of the concerns that will appear here are the professional-social aspects for the home nurses. If wired from their homes, they no longer need to go to a central work place to make data entries to order medicine or such for the next day. All this can be taken care of from their homes. While this may save resources in terms of transportation (time and cost) and medicine delivery, the risk of personal isolation for the home nurses is also prevalent. As professionals they clearly are in contact with many clients, but the contact with other professionals is greatly reduced if we were to eliminate the offices where the home nurses often meet at the end of the day. Such concerns are, however, not unique for this field, but typical when dealing with the effects of teleworking.

There is an enormous flow of data in connection with this service. Most of it is still not computerized since the classification in the municipalities varies greatly. So far, though, it has not been possible to get this part of the health sector, the municipalities, involved in the health data network. Also, there is a decentralized welfare service at work here providing the municipalities with autonomy to decide how much service they want to provide and the quality of that service. If all the data indicating the efficiency and effectiveness were exposed, privatization and standardization could be the answer. Also, centralization in steering might increase. The resistance towards this tendency is high in Denmark. In other countries, such as Norway and Germany, signs of centralization have already been observed.

While there has been a substantial pressure from the county administration and at the national level, the intended users’ need for the network varies. In general however, the need is sufficient to establish an interest and a commitment. About half of the respondents reported to have no discussions or plans for which educational requirements or challenges to the organization of the workplace could be posed by the network. With a general commitment to improve the treatment of patients, most of the initiatives are made, however, behind the curtain, i.e. administrative procedures. At the pharmacies, for example, from 25 to 30 percent of the prescriptions is received through the network. The rest is either called in by phone or sent by fax. Furthermore, all prescriptions are computed in their internal computer-system allowing them to expedite billing to the national health insurance and print labels for the drugs.

By contrast, in the pharmacies’ communication with the administration in the municipality, the records at the pharmacies are printed and then sent by s-mail to the municipalities. In the municipality, the records are entered again. Here, we point to an obvious need for the network. Yet, this seems to indicate that most of the participants, public or private organizations still think of networking as an internal matter, rather than as an interorganizational data network. One of the reasons for thinking this way is the relative limited resources for the network, especially in municipalities and hospitals. Another reason is –as suggested earlier-- economic motives. The limited personnel resources and economic resources are in most cases linked very closely.

Table 2. Impacts on Capabilities, Interaction, Orientation, and Values

<table>
<thead>
<tr>
<th>Variable</th>
<th>Health Data Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capability</td>
<td>Pharmacies and health insurance: substantial benefits</td>
</tr>
<tr>
<td>Interaction</td>
<td>Pharmacies-GP-health insurance improved Others unchanged</td>
</tr>
<tr>
<td>Political orientation</td>
<td>No impacts</td>
</tr>
<tr>
<td>Value distribution</td>
<td>Professional privacy challenged</td>
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<td></td>
<td>Patient access to own patient records</td>
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6. PRIVACY AND POLICY ISSUES

As revealed in the previous section, the health data network had considerable success if measured by the number of users, their satisfaction with the interface, time-reduction in receive/ recording responses from pharmacy
or letter of discharge, transmission of prescription, and retrieval of information. However, the network had little or no impact on treatment, communication pattern, and organizational issues. These results have implications both for the future of the Fuen network, its expansion to other areas within the health sector, and the development of nation-wide networks.

In developing and implementing the network, multiple actors have been involved. The increased policy attention received from international, national and local levels of government as well as from the private sector, also contributed to its recognized success. Besides, at the national and international level, multiple political and corporate actors have been advocating for the establishment of a network allowing the participating sectors to communicate faster and with increased accuracy.

Our view it that the health data network fits into this policy field, only if the developers stick with the network as it is at present and only expand it to areas that do not further cross highly controversial policy issues, such as privacy and professional and institutional interest. As pointed to in this paper, and revealed in Table 3, the health policy sector is a mix between top-down/ bottom-up steering. Health data network might facilitate either one. In Fuen, the bottom-up process that relies on the competitive elements in the health sector is the key to success, rather than top-down steering and centralized control.

It is interesting that though the health sector itself enjoy a high profile, the health data network has attracted little policy saliency, despite its potential to reduce costs in a heavily public financed policy sector. There are elements of signal and symbol attributes of such networks in general terms and in health data network, in the sense that IT and the data network have been portrayed as improving decision-making process. Such effects occur rarely, and often only marginally. Also, the ongoing reforms in the health sector to increase market orientation and competition in the health sector is of importance. Today the health insurance money is in the pockets of the patients, not the hospitals or the doctors. The patients are free to choose which hospital or doctors they prefer. Correlation between technical levels at the hospitals/ GPs and patient choice has not been investigated in this study.

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Health Data Network</th>
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<tbody>
<tr>
<td>1. Governance Issues</td>
<td>Managerial (time reduction, improved data surveillance, reduce mistakes in medicine delivery etc.) Incremental, rational</td>
</tr>
<tr>
<td>2. Central Monitoring Process versus Local Forces</td>
<td>Bottom-up process Autonomy Managerial interests determine involvement</td>
</tr>
<tr>
<td>3. Underlying Reforms</td>
<td>Modernization in part of the health sector in Fuen High variance in technical levels</td>
</tr>
<tr>
<td>4. Policy Sector Characteristics</td>
<td>Low policy salience</td>
</tr>
<tr>
<td>5. Interest Conflicts</td>
<td>Professional interests (privacy) Societal and individual privacy issues Few conflicts emerged</td>
</tr>
<tr>
<td>6. Driving Forces</td>
<td>Technocratic factors and private sector initiatives</td>
</tr>
</tbody>
</table>

One of the strategies to combat the waiting lists at the hospitals is to transfer patients to the primary health care after shorter hospital stays. Simultaneously, privatization of the health sector has been a means to impede competition. Yet, so far, privatization has been fairly low when measured by the number of treatments, etc. Within the hospitals, however, various services have been contracted to cleaning companies in order to reduce the number of trained medical personnel employed. This has caused an increased flow of information from doctors’ practices to laboratories, and vice versa. Needless to say, the administrative load at the doctors’ practices has grown. Computerization of the doctors’ practice patient records and electronic communication with hospitals, pharmacies, the health insurance, and the municipalities have been a means to cut cost for the practices. Though the overall health sector can be considered public, there are various important competitive elements and a geographic hierarchy that allow local variance and competition to surface and to secure development and technological innovation.
Thus, the push for the computerized data network, and in turn for the electronic patient journal (EPJ) came from more than one place. The National Health Insurance and in turn the Ministry of Health as well as other insurance companies are among the stronger players. With the outbreak of the HIV-AIDS virus, a great demand for patient information arose from the insurance companies. Through lobbying they were able to change the law, and obtain access to the patient files kept at the GPs and hospitals. This paved the road for the electronic data network to include information beyond transaction forms, letters of discharge, etc. Prior to that Fuen County has been particularly active in the development of the network, through the funding of the Center for Health Informatics.

While the county runs hospitals (only a small fraction is privately run), the GPs are private practices. The same goes for the pharmacies. As pointed out above, there is a multitude of institutions and actors involved in the network, each with a different need for being informedated. For example, while the GPs’ need to be informedated might be high, they might not want to expose possible cost reductions as a consequence of their investment in IT, since the reimbursement per patient from health insurance will likely be reduced. Similarly, through computerization it is possible to save a part of their administration costs, though it is very difficult to estimate who and how much is saved by investing and participating in IOS, such as EDI.

For example, in a publication the Danish Ministry of Technology and Research estimated that about 30 percent of the manpower resources at the hospitals are used for documentation and administration. They expected similar resources to be used at the GPs [5]. It is no surprise that this conclusion elicited a feverish response from the professional organizations and the hospitals. The 30 percent were taken from an American survey, which, they argued, was not applicable on the Danish health policy area. The quarrel ended with the Ministry withdrawing the estimate.

Secondly, one has to realize the complex organizational structure of the departments at the hospitals. Each of them is very eager to keep a firm grip on funds and make sure that funding is not lost to other departments. This is not to indicate that they do not want to be efficient, but that their willingness to expose results, documents, and departmental affairs in a computerized network can be limited. The network in Fuen focused on communication, but in order to gain the full benefit from a network, a computerized “base” must be present, which the health sector lacks. Also, within the hospitals one finds a very different organizational push for the network. There is a push from the administration, as well as the labs. But the clinical departments’ eagerness in this matter falls short.

Also, there has been intensive policy attention given to this field because of the cost of the health sector, rather than the network per se. Achieving and monitoring managerial benefits have been the goals for the network. Therefore, democratic and/or governance perspectives have been marginal or even completely ignored in designing and implementing the network. If the network were to expand to other areas, such considerations are essential to include as a part of the design of the network.

Though earlier in this paper we noted that the policy sector has a high degree of competition compared to most other policy sectors, we will in the coming years experience even more competition introduced especially within the hospitals and pharmacies. Also, issues of privacy are of importance especially when designing future health data networks. These issues conflict to some degree with the technical logic behind the data network. Instead of the concept of privacy, we here use the term value distributions to denote the extent to which the unit experiences positive and negative allocations of things that are valued (e.g., power, economic resources, status, privacy, and security).

The dramatic increase in the government's collection and retrieval of computer-based data on the behavior of individuals and groups has raised concerns in many countries about potential violation of personal privacy: are insufficient technical or legal protection against the collection and the combination of individual and group data, and how can we handle the fundamental value conflicts between the State's legitimate information needs and the individual's right to privacy. These conflicts are especially pertinent in social democracies, which need detailed information about citizens to provide governmental services and prevent fraud. In the health care area, such conflicts are also of a particular nature since various professional groups need access to the data on individuals for task completion [11]. On the other hand, the integrity of the patients needs to be maintained. Interestingly, we have not noticed any public reactions to the health data network. Adding the patient record to the transmission of x-rays and letters of discharge can however, trigger public opinion against the network. So far, no means have been used to include the voice of the
citizens/patients in the development of the health data network.

7. CONCLUSION

FuenCom was initiated by the County and in practice developed into a success because of a mix of top-down and bottom-up factors. However, institutions, pharmacies, GPs were actors at no point forced to participate in the network. Although it could be tempting to implement a national network and demand the actors in the health sector to participate, such initiative can be counterproductive to how the health policy area is regulated in Denmark.

In essence, our study points to that local and corporate autonomy is essential to make ongoing innovations and secure some degree of competition in a mostly publicly financed health sector. In Fuen, the number of GPs and pharmacies being wired is the engine behind the development. The relatively small scale of the network makes changes and quick feedback possible. National systems might come too late, address misleading or wrong issues, and hard to change. We find a bottom-up organizational process for such systems much more attractive. Thus, network should emerge at the lowest level possible (in this case at the county levels) initiated by local actors and interests, although this could challenge the control and autonomy of the Ministry of Health.

At the more general level, the policy issues that arise from our study confirm that there are substantial improvements of the capabilities of the participating actors and that the interaction between the institutions has been improved, although the course and power dimensions has not been altered. The expansion of the existing network to include other entries, such as electronic patient journals, is drawing attention to bureaucratic and professional resistance. Also, issues of privacy are likely to be substantial barriers for not only the completion of the network in the county, but also the development of similar network in Denmark. Our future studies will follow this network and will concern the four dimensions outlined in Table 1 focusing on five variables to study each the four dimensions. We will pursue three set of questions in the research: 1) how can the network balance the capability, interaction, orientation, and value dimensions and yet improve the governance of the policy sector?: 2) will the modernization of the (public) health sector encompass the local and central forces in a balanced matter or will the national level (try to) enhance their control using data network?: and 3) are privacy issues likely to emerge as a high policy issue and how can this issue be incorporated in the system development in other ways than a “bug”?

We will explore these issues from the individual perspective (the politician, the bureaucrat, the technician, and the citizen); the institutional perspective (software company, hospital, health insurance, county etc.), and societal perspective.

8. REFERENCES


