Information infrastructure for inter-organizational mental health services: An actor network theory analysis of psychiatric rehabilitation

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Abstract

In the supply of mental health services to communities, data and information are managed not only by clinical organizations, but also by welfare state agencies and charities. The aim of this study is to use methods of analysis from actor network theory to identify organizational interventions necessary for the development of an information infrastructure for inter-organizational mental health services. Data was collected in a project aimed at developing an information system that supports inter-organizational psychiatric rehabilitation in a Swedish municipality. Three organizational interventions were identified: an integrated service policy defined by the national government, a common legal framework allowing sharing of high-level client data, and commissioned support for local inter-agency workspaces. It is concluded that organizational interventions must be regarded when configuring an information infrastructure for mental health services. Organizational interventions should also routinely be addressed in systems design methods to be used in inter-organizational settings.

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1. Introduction

In most countries, health-related services are provided not only by clinical organizations, but also by different welfare state agencies. Together, these institutions share between them the responsibility of supporting community members in their total life situation. From a welfare state perspective, an additional intention is to regard an individual’s health problems in light of, for instance, social and labor market issues and vice versa [1,2]. To be able to make decisions with a focus on particular individuals and their total situation, the practitioners working in health care organizations and welfare state agencies must be able to co-operate. For this collaboration, information sharing and management are essential issues. The development of information systems that support the provision of inter-organizational health services thus requires that designers study and understand the social environment and the work practices in these settings. Paradoxically, however, research has shown that social aspects are currently seldom included when designing and implementing new technology to support co-operation between people within the same organization, or between people in different organizations [3]. The aim of this study is, therefore, to use actor network theory for the identification of organizational interventions needed for the development of a unified information infrastructure for inter-organizational mental health services. These interventions can then be addressed in system development planning. Psychiatric
rehabilitation is used in the study as an example application domain.

1.1. Health information infrastructures

The term infrastructure stems from 19th century military vocabulary, where it denoted the resources behind the front necessary to wage war, i.e., structures such as roads, industries, and railways, and included an industrial workforce. A modern information infrastructure also includes physical structures, such as computer networks and hardware, and skilled professionals providing specific services [4]. The reach of an information infrastructure is defined by the number of activities or processes that are supported, while its scope refers to the type and variety of processes being partially or totally automated [5]. This infrastructure is most commonly seen as a utility aimed at reducing costs of processing and communicating information throughout an organization [6]. Due to the fact that the performance of key organizational processes depends on the infrastructure, it must be aligned with the organizational strategy. However, the infrastructure may also be enabling, in that it can provide platforms for new applications and services. Even though modern information technology provides many new possibilities to further develop the information infrastructure of health and welfare agencies, only a fraction of these has thus far been exploited. The alignment of systems to organizational requirements has been pointed out as one reason behind this fact [7,8].

Many of the existing computer systems also operate in isolation, not capitalizing on the potential for improved data and information exchange. In the US alone, the net savings from national implementation of fully standardized interoperability between providers and five other types of organizations has been estimated to yield $78 billion annually, or approximately 5% of the $1.660 trillion spent on US health care in 2003 [9]. The clinical payoff in improved patient safety and quality of care could be even higher than the financial benefits, due to that giving clinicians access to data about their patients’ care from providers outside their organizations is predicted to also result in fewer medical errors and better continuity of care. During recent years, these circumstances have been highlighted and acted upon. A national health information infrastructure for the US has been proposed, based on an integrated strategy for personal health management, health care delivery, public health, and research [10]. The public and private sectors are in this context expected to collaborate in building this infrastructure, essentially a ‘paperless’ health care system.

1.2. Actor network theory

The associations between technological progress and social development have been conceptualized in several different theoretical models, e.g., systems thinking and the social construction of technology approach [11]. Another of these frameworks, which previously also has been applied to the study of information infrastructure, is actor network theory [12,13]. According to this theory, an actor network involved with the development of a new technology consists of all the non-technical and technical elements that influence action and decision-making in the development process. The theory grants all elements of such networks the same explanatory status. Examples of actors include individuals, groups, texts, graphical displays, and technical artifacts. Each actor in the network influences other actors so as to create an alignment of their goals and interests with their own interests. When this interactive process becomes stable, it results in an aligned actor network. In the case of health services, an actor network, thus typically includes patients, clinical practitioners, policy makers, and a diverse set of linked objects, e.g., diagnostic equipment, pharmaceuticals, and information system. An actor network is created through translation, a process that consists of three stages. During problematization, a focal actor identifies other actors that have goals and interests consistent with its own, and establishes itself as an obligatory passage point (OPP) [14,15]. The OPP is a mechanism that has to be passed by all the actors in order to satisfy the interests that have been attributed to them by the focal actor. The mechanism can consist of a formal code, such as legislation or contract, but can also be based on a technical device or an informal social norm. The second moment of translation is intressement, which means the process of persuading the other actors to accept the definitions initially provided by the focal actor. The third and final step in the translation is enrolment, where the other actors in the network progressively adapt common definitions and goals. The notions of global and local actor networks introduced by Callon and Law [16] are particularly applicable in the health service context. According to these authors, focal actors use a global actor network in order to obtain resources with which to obtain prevalent goals and objectives. This network can generate a negotiation space, where the process of planning and performance of particular actions takes the form of local actor networks. To be able to approach both the global and local networks analytically, therefore equal attention must be paid in actor network analyses to the micro-level local processes and the macro-level global structures, respectively.

1.3. Inter-organizational psychiatric rehabilitation

Inter-organizational supply of health services is today becoming increasingly common. One example is psychiatric rehabilitation services, which are usually provided by actors from several welfare state agencies. A general insurance providing an individual with rehabilitation and economic compensation for absence from work due to sickness constitutes an important part of many welfare state systems. In Sweden, government costs for the general sickness insurance exceed the expenses for regular healthcare. In 2000, 62% of those receiving compensation were women, commonly diagnosed with musculoskeletal
disorders and psychiatric illnesses [17]. It has been concluded that long-term sickness absence from work has grown to be an important social issue, and prognoses indicate that the problem will continue to grow unless some basic elements are identified and managed [18]. In addressing long-term sick leave patients with mental health problems, psychiatric rehabilitation is a service that involves more than one healthcare and welfare state agency [19]. People referred to the service comprise a heterogeneous group with multi-faceted problems, e.g. psychiatric illness, social issues, and substance abuse. These individuals cannot easily be categorized and, therefore, healthcare and welfare agencies must co-operate in order to find individual strategies for the rehabilitation process [20]. Beginning in the 1980s, multi-professional and inter-organizational teams have provided services to this group in need of community support [21,22]. Common themes in the work practices of these teams are case management methods, empowerment plans, patient-centered multi-professional conferences, and involving employers in workplace adjustments.

2. Methods

A case study design [23] was used to perform an actor network analysis of the information infrastructure underpinning the psychiatric rehabilitation services in a Swedish community. Case study methods were used for collection and preliminary structuring of data, while the theory of global and local actor networks [16] was introduced for the final analyses. The primary data were collected by video recording real-life information system design meetings in an inter-organizational setting. The final analysis of the data was performed in two phases. In the first phase, researchers with backgrounds in medical informatics and social sciences analyzed the data from the case study in order to construct a representation of the current actor network in psychiatric rehabilitation. Thereafter, additional clinical researchers joined the analysis to create an aligned actor network upon which to base a unified information infrastructure.

2.1. Case study setting

The study was performed in a municipality (population 41,000) in the south-western part of Sweden. Members of households in which the vocationally significant member was employed constituted 82% of the population below 65 years of age in this community, while members of self-employed households represented 7%. Members of households classified as not vocationally active constituted 10% of the population. Psychiatric rehabilitation services were in the municipality provided by inter-organizational teams with representatives from the social welfare office, the regional social insurance office, the employment office, and primary healthcare. The practitioners belonging to these teams worked part-time physically co-located with the team, and part-time at their original workplace.

The data collection was performed in a project aimed at developing an information system that supports work within local inter-organizational psychiatric rehabilitation teams. The systems development was performed from a participatory design approach [24]. This approach emphasizes formative system evaluations and organizational implementation [25] to ensure that user requirements are met in the final systems design [26]. A design group \( (n = 10) \) consisting of practitioners involved in rehabilitation, local managers, and system developers met 12 times during one year to discuss and adopt requirements on an information system that would support their work. In an ongoing phase of the project, the system is being implemented in an iterative process in which both researchers and users work together [27].

2.2. Data collection and analysis

All design meetings were recorded using a video camera. The soundtrack from the recordings was transcribed and analyzed using categorical aggregation. Triangulation of analysts was used to help control subjectivity in the analysis and to ensure conformability of the interpretations [28]. All parts of design group meetings where the participants addressed social and organizational issues were included in the final data set. The initial phase of the analysis was focused on current service structures and practices. The members of the research group with the best matching professional training performed this first step: an organizational scientist, a medical informatician, and a cognitive scientist. Data were examined to identify themes and to explore categories of micro-level work practice issues. The next order of analysis was performed together with clinical researchers to validate the issue descriptions and to relate them to the concurrent service policies. Thereafter, the analysis was focused on integrating the micro- and macro-level analyses. A global network actor was defined as one that uses a sociotechnical network in order to obtain resources with which to satisfy its goals. Correspondingly, a local network actor was defined as one who uses the negotiation space provided by a global actor network to build a particular organizational process in the form of a local network. In the second stage of the analysis, interventions were identified that would enable the establishment of an aligned actor network for psychiatric rehabilitation. Results from the different researchers’ analyses were compared, discussed and integrated in order to identify specific implications for a unified information infrastructure.

3. Results

3.1. Misalignments in the current actor network for psychiatric rehabilitation

The actor network analyses displayed three areas where inter-organizational mental health services suffered. These areas were service policy management, the legal framework
regulating data exchange, and maintenance of a local inter-agency workspace.

3.1.1. Separated global actor networks

In Sweden, the main part of healthcare and welfare state services are financed by income taxation and are organized in ‘quasi-markets.’ The focal actors at the global level of the service delivery are correspondingly the minister-led national government departments that formulate directives and regulations for competition between different types of service providers. Strategic decisions made by politicians at the global level are thus handed down to healthcare and welfare state agencies and progressively made more concrete, until they reach the practitioners at the operational level. However, as a result of weak government finances and fierce debates between the global-level actors, social welfare policies affecting psychiatric rehabilitation were during the 1990s modified three times (1991–1995–1997). In the study setting, an important problem for practitioners at the micro-level was therefore the translation and implementation of new political directives into their every-day practice. The practitioners, for example, thought well of a bill assigning the responsibility for defining a rehabilitation plan for long-term sick-listed employees to the employer, but they had difficulties adjusting their work routines to support the intentions of the bill. Difficulties in adjusting work routines can be explained by that the local healthcare providers and welfare state offices that cooperated in the inter-organizational rehabilitation team—the healthcare services managed by the county council, the social welfare services managed by the municipality council, and the social insurance office and the employment office managed by their respective national boards, were at the time of the study part of two separate global actor networks. The agencies managing the meso- and micro-level actors thus received directives from different focal actors, i.e. the national government department of health and social affairs, on the one hand, and the departments for labor market issues and industrial development, on the other (Fig. 1). The two networks had significantly different OPPs and working objectives, basically a consequence of the fact that the ministers-in-charge had different political agendas. While the department of social affairs aimed at providing high-quality healthcare and social welfare services on an equal basis to the population, the departments of labor market issues and industrial development were to reduce unemployment and high sick-leave rates.

3.1.2. Legal framework obstructing local collaboration

Based on the separation of the global-level actor networks, the practitioners in inter-organizational health service teams also had different educational backgrounds and had different systems for continued learning in their respective professions. In the case study setting, this fact combined with the idiosyncrasies of the involved agencies’ commissions led to that several different perspectives on service provision were represented in the inter-organizational group. It was therefore perceived as necessary to explicitly agree upon common working methods for each separate case. When a patient was accepted into the program, the team always negotiated an action plan customized to the patient’s needs. The intention was that this plan should be evaluated and revised by all agencies throughout the rehabilitation process. However, a recurrent problem was that the updated plan could only be available within the agency that, at the time of the agreement, was formally responsible for the process coordination. The reason was that the agencies did not have the legal right to access other agencies’ internal documentation regarding individual clients. In consequence, the inter-organizational team had to organize ‘workarounds’ in order to be able to construct an instantiation of the local actor network for each particular client.

3.1.3. Intra-agency work cultures

The work in the psychiatric rehabilitation teams was further complicated by the fact that most of the team members worked both in the inter-organizational context and with clients in their ‘home’ agency at the local level. The separation of the global actor networks had an impact at the local level in several ways, one of the more important being differences in the use of terminology. For instance, depending on the agency involved, the persons eligible for welfare services were called patient, client, customer, or ‘the insured.’ Moreover, with the exception of the seminar rooms for the physical meetings, there was no specific infrastructure in place to support inter-organizational practice. Consequently, it was often difficult for members of the rehabilitation team to contact each other, and much time was spent on trying to communicate. The telephone was the most commonly used means of communication between the practitioners. The reasons for having to get in touch with other team members were often trivial, but essential for being able to proceed with the action plan, e.g. deciding on a new evaluation date or a brief question about the client’s current activity.

3.2. Towards an aligned actor network for psychiatric rehabilitation

Three organizational interventions necessary for the development of sustainable inter-organizational mental health services were identified (Fig. 2).

3.2.1. Intervention 1: An integrated mental health service policy with one focal actor

The inter-agency rehabilitation team is an example of a new type of integrated healthcare and welfare state actors that was introduced in Europe during the 1990s. The appearance of these meso-level actors reflects two developments. First, it shows that healthcare and welfare state agencies have become more dependent upon each other, and second, that the quasi-market models for welfare state
bureaucracy, in which different agencies compete with each other, have become less functional. Instead of greater support for competition and polarization, there is a need for high-level integration of political directives and national government policies in areas that are currently separated. Examples of integrated policies that would facilitate the development of inter-organizational information systems include; harmonization of the geographical areas that the healthcare and welfare state agencies are responsible for, (in Sweden these range from municipality to county to nationwide) and requiring the use of common vocabularies for client-related concepts. Such integrated policies are only possible to implement at the national government level.

3.2.2. Intervention 2: A legal framework allowing sharing of high-level client data

The healthcare and welfare state agencies providing inter-organizational health services need to share data in case management processes, but they do not need to share all information that is collected and stored about an individual client. The need for client data sharing can be reduced to the transfer of data and information needed in order to contribute to the case management process. For example, all involved practitioners need to be informed about a client’s ongoing activities and the time perspective for these, but they do not need to know the client’s full background, i.e. family situation or previous medical
conditions. However, present legislation in Sweden, as in many other countries, does not tolerate the transfer of client data between welfare state agencies. Even if a more advanced technical infrastructure had been in place in the study setting, it would not have been possible to use it efficiently. A legal framework for sharing of intervention-related minimal data sets should be developed that can facilitate inter-agency team collaboration without breaching the client’s integrity.

3.2.3. Intervention 3: Commissioned intra-agency support for an inter-agency workspace

The inter-organizational rehabilitation teams involved in the case study had the advantage of being situated in a comparatively small community, and the practitioners knew each other personally. However, for such a partnership to develop into a truly collaborative workspace, it must receive structural support from each involved agency, e.g. through the integration of local information infrastructures.
customization of terminology and language use, and adaptation of working hours. Through commissioned support, a particular local inter-agency information system can be developed, where practitioners in different welfare state agencies can communicate on issues in case management processes more easily than is the case today. In such information systems, high-level information about the rehabilitation process could, for instance, be shared on a single screen, allowing the team to view the same central information. Nevertheless, if an inter-agency workspace is to replace the time-consuming communication methods currently in use, it must, above all, be commissioned by the local agencies involved.

4. Discussion

The aim of this study was to identify organizational interventions needed for the development of a unified information infrastructure for inter-organizational mental health services. Three interventions were identified: an integrated service policy defined by the national government, a common legal framework allowing sharing of high-level client data, and commissioned support for local inter-agency workspaces. From these results, two implications for the planning of a unified information infrastructure can be derived.

First, inconsistencies in mental health policies and strategies between agencies and government departments must be corrected. The structural gaps between the healthcare and welfare state agencies providing health-related services were at least partially caused by contradictory directives from the different national government departments involved. These structural gaps were predisposed for conflicts between the agencies in their view of single clients. Individuals were at constant risk of falling through the protective web provided by the social welfare system because no agency had an interest in collecting and managing data on the individual’s situation as a whole. Even a technically unified information infrastructure will fail to provide added value to the services supplied to the community if the strategies and policies of government departments, welfare state agencies, and healthcare providers are disjointed and the services not aligned. Second, the information infrastructure must be developed in parallel to modifications of the formal and informal social norms surrounding the inter-organizational practices. Although the welfare state agencies received directives from different government departments, the inter-organizational team members were dependent on each other’s organizational resources when adopting a rehabilitation process that would best suit a specific client. However, the practitioners were hindered in their efforts by the prevalent formal and informal social norms. The current legislation, in our case the Swedish Personal Integrity Act, did not allow free sharing of client data between welfare state agencies, and the organizational culture at the social welfare agencies was not supportive of inter-organizational cooperation. Consequently, the results of this study point out that development of a health information infrastructure requires integration across two boundaries, i.e. between different service policies and between service policies and the information infrastructure. This observation has relevance for high-level policy-making regarding health services. For instance, in the US, it has recently been concluded that competition in the medical marketplace, coupled with fiscal pressures affecting providers and health systems, makes it necessary that leadership for regional and national coordination of an information infrastructure for health services needs to come from governments [29]. Accordingly, a position as the National Coordinator for Health Information Technology has been created at the Department of Health and Human Services. The results of the present study have relevance for the type of policy-making and organizational context that can be expected to develop in other countries and regions in the near future.

As regards service policy integration, only voluntary agreements allowed the healthcare and welfare state agencies included in the case study setting to provide integrated services. The present data suggest that the lack of structured and contracted relationships formalizing the agreements between the local agencies was an impediment to teamwork in general and to information management in particular. Previous studies have shown that when local administrators have formalized a mandated relationship into a contract, the perceived effectiveness of that relationship becomes greater [30]. Nonetheless, policy-makers at the national government level still often choose to support improvised relationships between welfare state agencies. One exception is Northern Ireland, where one of the most structurally integrated models of health and personal social services in Europe has been implemented. Social and health services are jointly administered and this arrangement intends to promote collaborative working and interdisciplinary arrangements. A recent comparative study suggests that health services in Northern Ireland, in practice, have distinct advantages over their counterparts in comparable areas [31]. The results indicate that the benefits are associated more with integrated management systems and less with integrated practice-related activities. In the US, promising advances have been reported from programs based on intergovernmental partnerships in which administrators at different levels of government prod each other to ‘try and do more’ [32]. Thus, even in this market-oriented environment, an intergovernmental partnership has been found to be the best model for innovative health policy leadership. Nevertheless, further research is required into the effectiveness of high-level integration of health services in general, and the relation between integration and information systems development in particular.

The task of protecting client integrity while developing electronic data interchange between healthcare and welfare state agencies has proved to be more complex than expected. Recent studies have reported significant problems, e.g. application restrictions and incompatibilities, technical malfunctions, changing standards, and insufficient
dedicated resources [33]. The key challenge, however, is to coordinate enterprise security aspects with client integrity in a legal framework. Health consumer advocates have long argued that lack of trust in caregiver confidentiality frightens individuals with stigmatizing health disorders and thus deters them from seeking help, and there is today broad consensus among both policy-makers and practitioners on that confidentiality is a fundamental right of clients in the health service setting [34]. Nevertheless, while breaching confidential health information is an issue that has received considerable theoretical attention more research is required from practice settings.

Whether providing clients with online access to their own records or enabling members of inter-organizational teams to share high-level case management data, there are several benefits to online electronic systems that can ultimately lead to improved service outcomes. Therefore, as welfare state agencies move closer to a paperless environment and Internet-based applications, they must also be able to understand the increased risks to privacy and security that are incurred by using electronic systems [35]. Thereafter regulations must be developed that properly address system application, authentication, authorization and service provision practices, and most importantly, that the individual client’s life situation is not compromised.

When conducting research in organizational contexts, one must make decisions on the primary unit of analysis [36]. Most studies of health information systems have focused on the micro politics of technology design and implementation [37,38]. Even in this study, we chose activities within inter-organizational teams as the basic unit. This delimitation made it possible to categorize case study findings as external or internal to these teams. However, micro-studies of design practice, while invaluable in addressing interactions between technologies, users and work practices, often fail to account for the historic reach of decision-making at higher societal levels. Nevertheless, it is often these historic circumstances that contribute to present-day interactions between user, information system and organization that find expression—often indirectly—in daily work practices [39]. Therefore, a second order of data analysis was performed using actor network theory, whereby the higher-level social structures and informatics issues could be incorporated into a common model.

Finally, the forces we describe pay little attention to the viewpoints of the individual citizen. If some of these organizational pressures were put to the test of the patient and family perspective, radical change might result, whether in a welfare state or one governed by market forces [40]. With the growing international influence of consumer movements, yet another actor may soon take centre stage. Moreover, of course, sharing high-level information among organizations is from the perspective of a unified health information infrastructure only the beginning. Organizations and clinicians taking care of real patients and clients will need far more than high-level summaries. Optimal care will require timely and accurate laboratory results, medication lists, and other information collected by service providers, as well as the current information about the client. The long-term goal must therefore still be integrated services and electronic records that make it feasible to allow authorized users from authorized agencies to both access information and update it. One can envision providers ordering clinical treatments and social services on behalf of a client, clients registering their experiences with the services, and providers revising them, all done virtually, online.

5. Conclusion

High-level social and organizational aspects must be considered in an information infrastructure for inter-organizational health services. In this study, we have used actor network theory to identify three organizational interventions necessary to consider when developing such an infrastructure for psychiatric rehabilitation. These interventions should be highlighted in system design processes involving several healthcare and welfare state agencies in the tax-financed setting. In order to establish the general validity of the findings, future studies must address the research question in health service financing contexts other than the Scandinavian setting.

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