

## **Interplay of Institutional logics and Implications for Deinstitutionalization: Case Study of HMIS Implementation in Tajikistan**

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**Abstract:** This document describes the efforts to reform the Health Management Information System (HMIS) of Tajikistan. The authors were involved in proposing and piloting a computerized HMIS, based on a complete overhaul of the current data collection tools. This proposal advocated supporting local decision making by employing a flexible, decentralized system to collect, process, and analyze essential primary health care data. The institutional logics underlying the current HMIS in Tajikistan were heavily influenced by the tenets of central planning, quite alien to the ideas proposed. This paper explores the different institutional logics, and the interplay between them over the course of the project. It is clear that a complete deinstitutionalization, amounting to a paradigm shift, is necessary to overcome the differences in institutional logics, but at the same time this account shows how achieving this can be a remarkable challenge in a context of centralized control. This study makes some interesting contributions to the field of IS. It introduces a study from a country which until now has been almost invisible to the IS community, it contributes to the debate about bottom up and top down implementation, and provides a conceptual framework of institutional logics, their interplay and implications for deinstitutionalization.

**Keywords:** Institutions, institutional logics, Tajikistan, deinstitutionalization, health management information systems

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### **1 INTRODUCTION**

Tajikistan is a Central Asian country about which the mainstream Information Systems (IS) and development communities have not seen anything published. Gaining independence after the downfall of the Soviet Union in 1991, the country has experienced an extremely rocky period, with a prolonged civil war and the loss of the supporting Soviet financial and social infrastructure. Further challenges that the country face includes an extreme climate, a long and porous border with the war-ravaged Afghanistan, a recent food and energy crisis which had humanitarian proportions (Antelava 2008), and the exodus of many trained people because of weak employment and social opportunities at home.

As in many of the other Central Asian countries, there are urgent public health problems facing the country. The demise of the Soviet economic base, followed by civil war, has led to a surge in various communicable diseases in the last two decades. According to the World Health Organization, life expectancy has decreased owing to poor nutrition, polluted water, and increased incidence of diseases (WHO 2008).

Acknowledging the key role that ICTs can play in public health management, the Asian Development Bank (ADB) has established an organization called the Health Sector Reform Project (HSRP) in 2005 with the aim of creating various reform initiatives, including relating to Health Management Information Systems (HMIS). One of the authors of this paper had been invited by the ADB to participate in the HMIS related reform efforts, and he further enrolled the three other authors of the paper to create a joint team. This team then was responsible for the design, development, and pilot implementation of the national HMIS. However, carrying out these tasks was fraught with immense challenges, largely related to countering the existing institutions left behind by the Soviet legacy which favored a large manual system based on a centralized planning model. Understanding and addressing these historical conditions and trying to create new institutions based on a computer based HIS and favoring local analysis and use of information, was a key effort of the research team. This effort translated into the following two key research agendas:

What are the key institutions that challenge the introduction of ICT-based HMIS reforms in the context of a post-soviet economy?

Developing theoretical concepts inspired by institutional theory to understand the nature of these challenges and how these may be addressed.

The rest of the paper is organized as follows. In the next section, we propose key theoretical concepts from institutional theory that helps to develop our analysis. After providing a brief summary of the research methods used in section 3, the details of the case study are provided in section 4. The case analysis based on institutional theory is presented in section 4, which is followed by the concluding section on discussions and contributions.

### **2 THEORETICAL PERSPECTIVE: INTSTITUTIONAL LOGICS AND DE-INTSTITUTIONALIZATION**

The theoretical aim of the paper is to develop concepts that can help to identify existing institutions that shape the deployment of computer based HMIS and their associated processes. This can be seen to involve the creation and spreading of new institutions. So, what

becomes important for us is to understand what are the institutional logics in play, what are the new logics being introduced, their interplay, and how these lead to specific outcomes with respect to the efforts to introduce change, conceptualized as deinstitutionalization. We start our elaboration of the concepts 'institutional logic' and 'deinstitutionalization' by a brief discussion of the broader context-institutional theory and its application in IS studies.

Institutionalism is a theoretical strategy that describes the theory itself and seeks to develop and apply them (Jepperson 1991). Institutional theory has its formative roots in the social sciences (Scott 2001). New institutional theory, also known as neo institutionalism, differs from the 'old' one in that it focuses more on the cognitive aspects of institutions giving emphasis on the role of norms, symbols, myths, belief systems, and informal arrangements that are seen to influence organization culture in addition to the formal rules (ibid). The basic building block of the theory is the concept institution which is defined as "*multifaceted, durable social structures, made up of symbolic elements, social activities, and material resources*" (Scott 2001:49)

In the context of IS research, an increasing number of studies have adopted an institutional perspective to examine processes of IT development, implementation and use. This kind of analysis brings the institutional influences of technological changes into surface (Orlikowski and Barley, 2001). For example, an early study of Kling and Iacono (1989) shows that a computer based IS with stable structure for supporting and using it is difficult to change than otherwise. However, Fountain (2001) criticizes IS studies for ignoring the role of IT in shaping the existing institution. Trying to fill the gap, she discusses the reciprocal effect between institution and technology-IT can shape or being shaped by institutions. In a similar vein, Avgerou (2002) argues that IT on its own can be considered as an institution that can be seen to account adequately for the processes of transformation of organized activities in a society. From the perspective of HMIS, Noir and Walsham (2007) work is worth mentioning. Drawing empirical material from the Indian health care sector, the authors show the ceremonial roles that "ICT for development" plays in legitimizing development initiatives.

IS studies adopted the theory mostly to understand stability of institutions and resistance to change but not much on how to dissolve the existing institutions (deinstitutionalization) and create a new one. Our study contributes in filling this gap by studying two contradictory institutional logics that lead to the process of deinstitutionalization.

The concept institutional logic was initially introduced by Alford and Friedland (1985) to describe contradictory social practices. It further applied and expanded by others including Thornton and Ocasio (1999; 2008), Scott et al (2000). Institutional logic is defined as '*the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality*' (Thornton and Ocasio, 1999:804) These logics inscribe the 'organizing principles' that supply practice guidelines to field participants (Friedland and Alford 1991) Institutional actors, then, can be viewed as agents and carriers for producing and reproducing the logic within a specific institutional environment (Scott et al. 2000)

Thornton and Ocasio (2008) discusses four mechanisms of change in institutional logic 1) institutional entrepreneurs:-these are agents of change who play critical role taking advantage of the position they assume in social locations 2) Structural overlap:-occurs when previously distinct organizational structures are forced in to association 3) Event sequencing:-temporal and sequential unfolding of events that dislocate and transform interpretation and meaning of cultural symbols 4) competing institutional logic:-results from competition of alternative logics. Competing logics may facilitate resistance to change and can be antecedent or consequences of change. For example, Currie and Guah (2007) illustrated how competing

institutional logics (the change initiator vs. health care practitioners) influence an IT enabled change in six UK National health Services.

Institutional logics are never homogeneous, and within an organization multiple logics may be simultaneously in play leading to the construction of institutional contradictions (Friedland and Alford 1991). For example, in the context of Geographical Information Systems (GIS) use in the forestry sector in India, (Sahay and Walsham 1999) elaborate on two sets of logic in play. The first concerns the logic of how foresters make decisions on forest management based largely on political and social considerations such as the minister wanting to take up water conservation activities in his political constituency. The second concerns the contradictory logic inscribed in the GIS which is based on making such decisions (of locating forestry interventions) based on scientific modeling enabled through the GIS. The interplay of these two logics, Sahay and Walsham point out; contribute to the less than effective uptake of the GIS in the forest department.

Negotiating and reconciling conflicting institutional logics may contribute to the deinstitutionalization of the existing logic and re-institutionalization of the new (Jepperson 1991). Deinstitutionalization is “a process by which institutions weaken and disappear” (Scott 2001), and “takes place when established meanings and action in an organization are discredited, either as a result of competing meanings and actions or because they are seen as failing to contribute to the institutional *raison d'être*” (Avgerou 2002). Further, Oliver describes deinstitutionalization as follows:

*“the process by which the legitimacy of an established or institutionalized organizational practice erodes or discontinues. Specifically, deinstitutionalization refers to the delegitimation of an established organizational practice or procedure as a result of organizational challenges to or the failure of organizations to reproduce previously legitimated or taken-for-granted organizational actions”* (Oliver 1992)

Oliver points out three key factors that contribute to deinstitutionalization: political, functional and social. Political pressures may evolve under threat of erosion or displacement as new and emerging practices may challenge the utility and legitimacy of existing ones. Functional pressures relate to technical or functional considerations that may compromise or raise doubts about the instrumental value of an institutionalized practice. Social pressures include increasing normative fragmentation within an organization as a by-product of other changes such as increasing workforce diversity or addressing the problem of high turnover. There can be disruptions to an organization's historical continuity (such as mergers) or changes in state laws that can prohibit or discourage the perpetuation of an institutional practice and its associated deinstitutionalization. Apart from intentional change processes, there can be unanticipated or unintentional consequences of purposive activities leading to new institutions (see for example Hwang and Powell 2005).

In summary, the focus of our theoretical analysis is to firstly understand what are the existing and proposed institutional logics surrounding the introduction of computer based health information systems in Tajikistan. The concept of deinstitutionalization further helps us to theoretically understand the interplay between different logics, why certain logics stay, why others erode away, and what social, political and functional pressures contribute to this.

### **3 RESEARCH METHODS**

#### **Research approach**

A useful method to develop and implement HMIS in developing countries suggested by Braa et al. is that of action research based on the principles of "networks of action" (Braa et al. 2004) They build this argument within the context of a global interaction called HISP (Health

Information System Programme), which involves among other things the design, development, and implementation of a free and open source software called the District Health Information Software (DHIS) . Taking their point of departure of trying to address the commonly perceived problems of lack of sustainability and scalability of HMIS in developing countries, they draw upon Elden and Chisholm to argue for the need to carry out action research in networks rather than singular units (Elden and Chisholm 1993). Such an approach, they argue, provides the potential for multiple sites to learn with each other, share experiences and knowledge, and to plan and implement action in a context specific manner.

With this background, our action research approach approached the question of network building at two levels:

1. Global level: to examine how the global HISP network could be leveraged upon to support the process of adaptation to the local context of Tajikistan, and mutually, how the global network could learn from the Tajikistan experience.
2. Local level: Within Tajikistan, to understand what kind of socio-political, technical and health related networks could be mobilized in order to support our overall project aims of HIS related reforms.

The specific interventions that we carried out with respect to building these networks of action at the two identified levels are summarized in the table below.

<b>Table 1 Interventions and relation to Networks of Action</b>		
Action interventions carried out in Tajikistan	Global network building and leveraging	Local network building
Situation analysis: Document study, interviews, presentations, discussions	<ul style="list-style-type: none"> <li>• Adopt best practices from global experience to the specific needs of Tajikistan</li> <li>• Gain experience from Central Asian primary health care practices</li> </ul>	<ul style="list-style-type: none"> <li>• Enroll interests in HMIS reform process</li> <li>• Establish local network covering the fields of health and IT</li> <li>• Build awareness of HMIS challenges and ways to address them</li> </ul>
Software development: Expand functionality, database design, application translation, report generation, creating validation rules	<ul style="list-style-type: none"> <li>• Adapt Global DHIS to the Tajikistan context</li> <li>• Advance DHIS with new functionalities developed in response to Tajikistan requirements</li> <li>• Enroll Tajik competence in global DHIS development</li> <li>• Establish a software development node in Tajikistan which could potentially serve as a hub in the future for Central Asia</li> </ul>	<ul style="list-style-type: none"> <li>• Develop a local team, committed to Free and Open Source Software Development</li> <li>• Develop feedback mechanisms between users of DHIS in the district and the developers</li> <li>• Build capacity of local team to support HSRP and also the community of users</li> </ul>
Capacity building: Training sessions and	<ul style="list-style-type: none"> <li>• Adapt training material and practices from other</li> </ul>	<ul style="list-style-type: none"> <li>• Formalize training procedures and content for health</li> </ul>

follow-up activities in district and national level	settings to Tajikistan <ul style="list-style-type: none"> <li>• Contribute to global repository of training material and examples from Tajikistan</li> <li>• Create training material in Russian which could be made available to other Russian speaking nations</li> </ul>	information officers <ul style="list-style-type: none"> <li>• Develop training capacity at national and district level</li> <li>• Conduct orientation training to help create greater buy in and support</li> </ul>
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### Data collection methods

Data was collected through various means. The following two tables summarize the data collection methods applied. While Table 2 provides detail about the type of methods we used and when they were conducted, Table 3 sums up the respondents according to institution, the issues raised and the length of the interview.

Type	Nature and volume	When
Interviews	10 at national 6 at district	Situation analysis Pilot implementation
Presentations	4, for ADB, MOH, donor partners, and closing presentation for HSRP, MedStat, and MOH	Situation analysis and end of project
Workshops	Training and discussions, 1 for national level participants, 1 for Province and district level, and 1 in pilot district for district health programs	Launch of Version 1: Tajikistan HMIS and Pilot project
Document study	Previous projects reports, Current reporting forms	Situation analysis
Informal discussions	Numerous with HMIS consultant, HSRP staff, local software developers	Daily
Participant observations	Use of MedStat software at national and district level. Study of information flows and practices around recording of data, use of registers etc.	Regularly
Data collection through emails	E-mails with HMIS consultant, software team, amongst ourselves	Continuous and ongoing
Software prototyping	During definition of datasets, creation of reports, identification of controls	Continuous and ongoing

Institution	Respondents	Types of issues raised	Time
Different national health programs	Deputy director or director level	Current system and its challenges, data quality, information needs, information gaps	1.5 hours
Different district health programs	District or central district hospital program directors	Information flow, use of information, reporting routines	30-45 minutes
International NGO	Country representative and HMIS representative	Past experiences of HMIS implementation in which they were involved	1.5 hours
Local software entity	Director and staff	Technical and infrastructural challenges related to software implementation	1.5 hours

#### **4 CASE STUDY**

The project was initiated through an invitation to a University of Oslo professor by the ADB to work with HSRP on the design, development and implementation of a computer based HMIS in Tajikistan. The project was carried out in an intensive period of about 3 months from November 2007 till early February 2008. Broadly, the project components involved an initial situation analysis and identification of local technical partner, followed by a month of systems development and the pilot testing of the first prototype, and then followed by 2 weeks of initiating pilot testing in one district (Kulyab). The case narrative is structured in two sections: Existing situation: Institutional logics at play; HMIS intervention: Proposed institutional logics.

#### **Existing situation: Institutional logics at play:**

The central control of the HMIS was under the Medical Statistics division (called MedStat), and true to its name reflected its focus on treating the HMIS as an annual statistics generating tool. The MedStat division had an out of date software (also called MedStat) built upon a FoxPro platform which basically was capable of entering data on the existing 37 reporting forms by the facilities and generating the aggregated reports by rayons, oblasts<sup>1</sup>, and nationally. From the reporting forms, two were reported monthly and the rest annually. MedStat was not capable of generating any indicators, and for this purpose the required data was fed in separately to a WHO created program called DPS (Data Presentation System) and the generated indicators were uploaded into a national website. In addition, there was another program called Factor which obtained data from the oblasts on five variables related to maternal health. Electronically, the three programs did not “speak to each other;” despite being all under the control of the MedStat division, and the IT specialist told us that there were no further plans to upgrade the MedStat software.

Going below the level of 37 forms, corresponding to different health programs with a great deal of overlap and redundancies, there were 367 recording forms that were used at the

<sup>1</sup> Rayon and Oblast are the Tajikistan equivalents of District (typically 50.000 to 100.000 inhabitants), and Province (10-15 districts) respectively

primary health facilities to record the basic services provided. At the rayon level, the different health programs put their respective data on the MedStat forms, which were then sent to the corresponding oblast health program, and also to the Statistical Department at the Central Rayon Hospital. Further, there were parallel reporting system in place with both the health programs and the MedStat department sending the same information to their corresponding superior level. However, since the MedStat software was not compatible with other software, use of computers was limited. A TB program manager described this:

*Also, we have 16 computer specialists, but only in Kulyab and Dushanbe. But the problem is we cannot use the data from Kulyab and Dushanbe which is entered in Epi Info, because we have to adapt the data to be entered in MOH formats. So, to MedStat, we only send data on written form...this is a structure which is more than 75 years old.*

Further, poor IT resources in particular health divisions further impeded the use of computerized data, as informed to us by a Deputy Director of the national TB programme:

*We want to include all data in Tajikistan, but some is always missed. Now we need one IT specialist and train him full time to work on Epi Info. How we reach the 66 centers, when we have no budget, no travel money, no nothing.*

Further impediments to the use of computers concerned the availability and permission to use paper. We were told paper was not regularly provided, and the limited budgets did not allow local purchase of this. For instance, in Kulyab district, we were told that the yearly budget for gasoline would be spent in just a couple of weeks of normal activity, so the purchase of paper did not assume high priority. A senior official of a donor agency narrated to us his experience of how inventive methods were applied to produce reports at the local level:

*When asked how the reports were prepared, he (a doctor at the Rayon level) said he will tell (about how reports were prepared) if his name is not quoted. He said, he bought one chocolate to the room of the specialist responsible for the data. The Specialist generated the report for the whole district. We (the aid agency official) told [the director of MedStat] that this is the cost of your reporting system – one bar of chocolate.*

Given the huge size of the data to be reported upon (about 30,000 data elements) on a routine basis, the extremely poor HMIS related resources, and that reporting was seen as an irrelevant exercise, data quality was an obvious victim. The head of the HMIS task force at the MOH admitted that the use of the ICD 10 codes for classification was fraught with errors, and he estimated that 35% of the data in this system would be incorrect from classification errors itself.

The reporting forms were poorly designed and were comprised of multiple sub forms. To give an example, we found one form titled “Treatment Prophylactic Activity of Facility” to contain about 50 sub forms, covering 1836 data elements, and spanning about 75 pages. This “gigantomania” fostered intermediate forms designed locally for local use. One example is a form provided by the Infectious diseases department at the central district department which they called an “emergency form.” In this form, 8 essential diseases were listed (and spaces left for others), and were reported by the different rural health centres (shown as columns). This form was used for local purposes in addition to the standardized recording and reporting forms (prepared for national reporting).

**Figure 1**  
Emergency  
infectious

form on  
diseases

Summary

existing institutional logics that we identified include:

- Central planning for statistics management (supporting curative rather than preventive health).
- HMIS as annual statistics generating tool.
- “Gigantomania”, collection of extensive data signals seriousness and scientific vigour.
- Computers can be employed to automate paper-based systems.

of the

### HMIS intervention: Proposed institutional logics

The proposed HMIS was a system based on a free and open source HMIS application designed and developed under the HISP. A first step in the design process was the re-organization of the existing data forms, proposing to organize health data in relevant health categories rather than forms. Further, we suggested that there should be two broad categories of routine data (reported once a month) and semi-permanent data (reported annually).

Furthermore, we suggested a radical reduction of data to be collected, and a shift to indicators (rates and ratios), rather than just data elements (counts). A smaller system would have positive impact on both time consumption for data entering and ambiguities related to correct use, and hopefully help to improve the level of data quality. Shifting the focus from counts to indicators, the data would assume relevance for decision making across time and space.

However, when we presented our proposal for redesign based on data sets (and not forms), it was rejected as we were told that “the Central Statistics Authority has approved the existing 37 reporting formats, and we are not even allowed to change or add a logo to the form.” So, leaving aside implementing a proposal involving a radical redesign, we were not even allowed to change the location of a single piece of data in the existing formats. We then made a design decision that we would take each of these reporting forms to each represent a data set, and have groups defined within each of them, each corresponding to a sub form. So, our design approach ended in developing a maximum data set (rather than a minimum data set), and we rationalized this (rather unpleasant decision of automating existing inefficiencies) by telling ourselves that through this approach of one-to-one automation would help us in the first place to get the existing data into the computer. This could then be followed up with a process of analysis of existing data, making visible the poor quality of existing data to the planners, and with this make a stronger argument for applying our minimum data set approach in the next

iteration. But, as the World Bank representative told, a smaller system was not seen as compatible with central planning, and he was skeptical about chances of our success:

*"We wanted to simplify the system, when the consultant showed the MOH a system with 15 indicators, they laughed, how can it meet the needs of the health system? They laughed and did not accept it. This is the paradox – we want a huge system, but don't have the money. They are suspicious of small systems"*

The issue of control rules is worth mentioning. The tabular forms in MedStat required many data items to be recorded twice. For each row item, such as Malaria, there would be columns both for age groups and gender, and also a column for the total. Data would then appear twice, both in a specific age-group, and in the total. In DHIS, data items can be set to be calculated automatically by aggregating other items, so that totals could be produced on demand, and not have to be entered at all. This could reduce the amount of data items by around 3000. However, this was not to be implemented, as it was still in the MedStat administration's intentions to manually enter totals, and then run checks on them against their various components. This had been included in the MedStat software with a set of so-called controls. These controls made sense in a paper system, where manual aggregation into totals could produce errors. This "paper verification logic" was applied to a computer system where the possibility of manual aggregation error could be eliminated altogether. The development of the same set of controls in DHIS as in MedStat became a compulsory requirement from the MedStat team.

Summary of the HMIS intervention related institutional logics that we identified included:

- Decentralized decision making based on routine data.
- HMIS is indicator- and action-led.
- Small, essential data sets best supports action and improves data quality.
- Computer systems should be employed to internalise routine aggregation, increase flexibility, and decrease response-time to changes in epidemiological information needs.

## **5 Analysis: Interplay of logics and implication on deinstitutionalization.**

In the case study, we have tried to elaborate upon the institutional logics which we found to be in play through conducting the situation analysis of the HMIS in Tajikistan, and also the logics which we believed were inscribed in the HMIS related intervention that we were seeking to introduce. In this analysis section, we will describe the interplay of these two sets of logics, and how this shaped the process of deinstitutionalization that we were seeking to bring about in the existing HMIS. Specifically, we discuss two sets of interplays:

1. Statistics for central planning and control versus using information for decentralized action.
2. Rigidity of paper based reporting formats versus the flexibility of electronic customizable forms.

### **1 Statistics for central planning and control versus using information for decentralized action**

The Tajikistan system is a historical product of a Soviet system of governance, and nearly 2 decades after the breakdown of the USSR, the deep rooted Soviet institutions can still be seen to be in play. In another context of collectivization (before the Second World War), this has been described by Scott as "gigantomania," referring to the focus on trying to collect huge amounts of data as a form of centralized planning and control (Scott 1999). In the post-Soviet

system in counterparty Tajikistan, the routine health system seeks to collect data on more than 30,000 data items on all kinds of diverse items such as soil samples, airplane vibrations, cigarette smoking in addition to health programs.

Further, the Soviet system is acknowledged to pride itself to be based on a strong scientific foundation. This historical tendency is reflected in the Tajikistan's MOH decision to use the full blown version of the ICD 10 system. The implication of this was each disease was classified by various codes, and each code had various sub codes and sub-sub codes. In the Soviet era where in the central system there was a high level of scientific and technical experts, the data collected from the peripheral levels was subjected to a serious scientific scrutiny. However, now the amount of such experts had been dramatically reduced. While similar levels of detailed data is expected to be collected now, there has been a simultaneous decrease in the capacity to both collect good quality data and also the skills to analyze and use the data.

In contrast to this existing system, the HISP philosophy towards HMIS development can be seen to be a historical product of post-apartheid 1994 South Africa, a period of ANC driven reform based on an agenda that emphasized decentralization and integration (Braa and Hedberg 2002). The HISP project within this context sought to develop free and open source software which could be installed at the local levels, and large scale capacity building programs would be carried out to empower the health workers and making them use "information for local action." These principles and practices of the HISP initiative were inscribed into the design of the software (DHIS -which emphasized local flexibility and user control), and became part of the training material used for processes of capacity building of the health staff.

However, adapting these principles of use of information for local action in Tajikistan would involve the incorporation of a whole range of HISP principles, including the creation of a minimum data set, linking data being collected with indicators, and large scale capacity building programs of the health staff with a focus on the use of information. However, we soon realized that these aims were unattainable in the present scenario. Firstly, no permission could be obtained to make any changes, even the removal of duplicate data elements that were included in the same form. Further, the system we found was not mature to absorb the shock of these large scale and radical changes. Since even the basic information processing systems were not in place, such as for collecting quality data, it was too ambitious to expect local staff to start on the analysis of data. There were further constraints such as the poor capacity of the health staff, very weak infrastructure, and the extreme climatic conditions which made it difficult to travel to the districts to carry out the training programs.

The interplay of the two sets of logics thus resulted in our adapting a strategy of maintaining the status quo in terms of their reporting forms, their numbers and design, but translating this status quo into an automated form. The reasoning being that by the analysis of the information inscribed in this status quo system, we could make visible the poor quality and the absurdity of the current design. This we believed would help us to make a stronger case for change in the future, and when changes would be approved we could be able to easily adapt it to the flexible DHIS based HMIS application.

## **2 Rigidity of paper based reporting formats versus the flexibility of electronic customizable forms**

For both institutional and technical reasons, the paper formats which were in use were inscribed with a deep sense of rigidity. Institutional reasons consisted of the costs associated with the production of new formats, the logistics problems of their reproduction and distributing them to the hundreds of facilities, some of which were located in geographically

inaccessible regions. The size of the individual forms made the task of changing a paper based form extremely daunting. Furthermore, the existing forms had only recently been approved by the Central Statistical Authority, and so no further changes could be made for at least 5 years which corresponded to the national planning cycle. The technical reason contributing to the rigidity of the form was the much cluttered design which was full of multiple rows and columns. For example, some of the forms had about 250 rows and 12 columns, which would have been very difficult to modify in technical terms.

Bathed in the philosophy of flexible systems and local action, HISP saw forms as something very flexible which could be modified at will based on user needs. The entire software had been built on a modular structure, and changes could easily be made at the data entry level without affecting other parts of the system. Furthermore, some technical innovations were created by the software development team, specifically concerning the “multi-dimensional” data element to replace the existing uni-dimensional data element. Through this innovation, previously existing multiple uni-dimensional data elements (for example, children in different age categories which would be treated as different elements) could now be treated as a single data element (children) having multiple categories (representing age groups). This innovation was further combined with another development of a customized data entry screen by which the data entry could be done on the screen which replicated the paper form, as contrasted to data entry through a list of data elements organized vertically. The screen shots below illustrate the two systems of data entry. The combination of these two technical innovations provided us with a great deal of flexibility in the design of the forms.

1. INFECTIOUS DISEASES																	
Name of disease	No row	Code ICD-10	Registered diseases								From paragraphs 3,4,5,6 organized		Rural inhabitants		Registered death cases		
			Total	From them							Nursery visits	Visits of kindergarten	Total	including 0-14 years	Total	including 0-14	
				0-14 Years old	0-1 Years old	1-2 Years old	3-4 Years old	5-6 Years old	7-14 Years old	15-17 Years old							18-19 Years old
A	B	C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Infectious diseases, total	1																
Cholera	2	A00															
Vibriocarrer of cholera	3	Z22.1															
Abdominal typhoid	4	A01.0															
Paratyphoid A, B, C	5	A01.1,2,3,4															
Bacteriocarrer of abdominal typhoid and paratyphoid	6	Z22.0,1															
Other salmonellosis infections	7	A02															

Figure 2: Form 1 customized data entry form, english version

Nr	Data Element	Min	Entry	Max	Comment
1	<a href="#">cholera</a>		<input type="text"/>		[No comment] <input type="button" value="v"/>
2	<a href="#">infectious disease total</a>		<input type="text"/>		[No comment] <input type="button" value="v"/>
3	<a href="#">vibrocarrier of cholera</a>		<input type="text"/>		[No comment] <input type="button" value="v"/>
4	<a href="#">abdominal typhoid</a>		<input type="text"/>		[No comment] <input type="button" value="v"/>

Figure 3: Form 1 with data elements listed vertically in standard layout

The interplay of these two logics came in when we started to make suggestions in the design of the screens, showing how space could be used better, or by making aesthetic based improvements. However, the argument of no permission for changes was used to shut out our requests. When we started to say that we could try out some new designs on an experimental basis and change over easily if it did not work, it was still no go.

### Interplay of logics and implications for deinstitutionalization

As Oliver has pointed out that deinstitutionalization arises from pressures relating to social, political and functional. These pressures, if gaining adequate momentum can create a sense of dissensus in the existing institutions and provide the impetus for the dissipation or erosion of existing institutions. In the case described, the interplay of the institutional logics could demonstrate a great deal of functional dissensus and how the existing system was

operationally inefficient, based on poor quality data and providing data which could not be used. We demonstrated this functional deficiency through out analysis, for example through showing that in some of the forms nearly 90% of the data was being reported as zeros or blanks. We also argued that while a huge amount of data was collected, no indicators were being used. However, the Ministry of Health just flatly refuted our claim and just said that no data was being collected that was not being used as an indicator. When examples were shown by us to the contrary, they were just brushed away as being exceptions.

A degree of social pressure had been placed on the MOH to reform their HMIS through efforts of the World Bank and ADB that had created specific structures (like the establishment of the HSRP office) for guiding reform efforts. However, since the HSRP was an independent structure, and had a time bound life (of 3 years); their recommendations were not binding on the MOH to accept. However, on the political front, we failed to create adequate momentum and pressure to trigger change. The political decision making centre was at the MOH who were closely aligned with the MedStat, and our influence on that was minimal. Our alignment was with the ADB who were primarily considered as a donor (that too in the form of loans), and thus not sufficiently powerful to enforce change.

In summary, it could be seen that the interplay of logics primarily intersected on the functional domain, and confronted with a strongly historically embedded system, could hardly make a dent on the political domain. However, what we succeeded to do was the creation of some seeds of change, firstly by creating a system that had an inscribed flexible logic which could be modified into a more effective HMIS in the system in the future (when the political conditions would be more favorable). Another gain could be the fact through our various reports and presentations; we had introduced new discourses into the HMIS reform efforts, such as related to use of information, the use of indicators, and data quality and validation. So, while some seeds for deinstitutionalization had been planted, adequate political pressure could not be created for deinstitutionalization to take place in practice. This also emphasizes, institutional change processes are painfully slow.

## **7 CONCLUSIONS**

The interplay of the two sets of logics basically involved two different paradigms which at one level were irreconcilable and could not coexist. However, we believe that in such a historically embedded system, a paradigm shift would only come about if mandated explicitly from the top political authority – the health minister. While local level incremental efforts may be useful to create some local expertise and knowledge, the lower levels have really no authority or voice to influence change. The strategy of local empowerment which had worked for the HISP project in South Africa was a product of the historical moment that existed, one arising from the breakdown of the apartheid system and the political agenda that mandated decentralization and integration.

This study makes some interesting contributions for the IS field. Firstly, it brings into the map a study from a country which till date has remained nearly completely invisible to the IS community. Hence, the paper expands the already existing knowledge about IT-enabled HMIS change process in developing countries. Secondly, it contributes to the debate about bottom up and top down implementation models by arguing that such decisions are products of historical circumstances, and bottom up may not be always most effective even though ideologically appealing. Thirdly, the conceptual framework of institutional logics, their interplay, and implications for deinstitutionalization, provides an interesting approach to study implementation experiences more broadly, not just HMIS in a post-Soviet republic. In other circumstances, there would be different forms of logics would be in play, and studying them would provide rich insights into the implementation dynamics.

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