

Contextualizing ISs integration through organizational and institutional milieu: A Case Study from a Regional Public Health Bureau in Northern Ethiopia

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Abstract. Health sectors of low-income countries have been under 'reforms' for more than a decade. Major precursors for the reforms include under performance as a result of poor management, lack of resources and organizational failure. One major component of most reforms accordingly includes integration of the different health care services and their management functions to improve efficiency and effectiveness. One such area increasingly becoming an important agenda in low-income countries is integration of the fragmented health information systems (HISs) that corresponds to various health programs. In this paper, we examine such an integration attempt in a regional public health bureau of a low-income country. Drawing on a framework from neo-institutional theory, this paper extends our understanding of the integration phenomenon from the perspective of group dynamics and environmental context. The paper argues understanding of the dynamics of groups within organizations as well as that of the broader environment they are embedded in is crucial towards developing strategies to effect the required change.

Key words: Health Information Systems, Health Management Information systems, Health Information Systems in Developing Countries, Information Systems Integration, Institutional perspective

Introduction

Health sectors of most countries all over the world have been under 'reforms' for more than a decade. Major precursors for the reforms include under-performance resulting from poor management, lack of resources and organizational failure (World Bank, 1993). One major component of most 'reforms' accordingly includes the integration of the different health care services and/or their management functions to improve efficiency and effectiveness. One such area increasingly becoming an important agenda in low-income countries is the integration of the fragmented information systems (ISs) that corresponds to

various health programs and services (de Kadt 1989, Lippeveld 2002, Chilundo and Aanestad 2004, AbouZahr and Boerma 2005, Braa et al 2004).

Many argued that the existing fragmented data collection and reporting systems provide far less sound information than is needed for effective decision making (de Kadt 1989). Furthermore, the way data collection and analysis has been done often leads to excessive burden of data collection with multiple overlaps and mismatches between various health programs (Braa et. al. 1997, Lippeveld 2002).

Reports on attempts of resolving these problems so far are scant and lacks a success story. A number of constraints were identified including inadequacies in both computer-based infrastructure, the persistent presence of legacy systems embroiled with different institutional interests (Nhampossa 2004), weak human resource capacities both in numbers and skills (Chilundo 2004). Chilundo and Aanestad (2004) argue that integration of information systems needs to consider the tensions resulting from different realities and rationalities. They emphasised the tension between the rationality of policy makers (government and donors) 'at the top' who consider integration to increase efficiency of the sector, and access to complete, coherence and non-redundant information ('managerial rationality'), to those 'on the ground' (health workers at health care facilities), who neither has adequate resources nor interest for local use of the collected data, rather preferred to spend the largest amount of time on the needy patients ('contingent rationalities'). The central concern in their research was to unpack the tension between those 'at the top' and those 'on the ground'. Their research marginally highlights the constraining or enabling dynamics that could exist at the same (horizontal) level - both at the broader environment and at the organizational level.

The purpose of this study is to extend understanding of the integration phenomenon from the perspective of group dynamics and environmental context. Such understanding of the dynamics of groups within organizations – as to their interests, values, and capabilities – as well as that of the broader environment they are embedded in is crucial towards developing strategies to effect the required change.

The paper is structured as follows. A conceptual framework used in this study is first introduced from the organizational literature. Then, the research methodology employed in the study including the research site and data collection methods are presented. The next section presents the case study followed by analyses and discussion. Lastly, concluding remarks are forwarded.

Theoretical Perspective

Many theories have been proposed to account for the ways in which organizations change. One category of theories, *dialectical theories*, assumes that organizations

exist in a pluralistic world of conflicting forces that compete with each other for domination and control (Van de Ven and Poole 1995). Stability and change are explained by alterations in the balance of power among opposing entities. This strand of theories further emphasizes the role of environmental factors for change. According to this perspective, environmental factors not only constrain and influence organizations and their participants; they also infiltrate, construct, and empower them. This strand of theory also recognizes that, organizations and participants are not the passive pawns of external events, allowing external forces to freely reshape them, but take steps to control, modify, and challenge these forces (Scott et al. 2000).

In line with such conceptualization of change, Greenwood and Hinings (1996) provide a dynamic framework in which they adopt insights from the new institutionalism to explain the normative contextual pressures that constrain organizational change and insights from the old institutionalism to explain intraorganizational political dynamics that produce change. They argue that change or stability can be explained

‘through the ways in which organizational group members react to old and new institutionally derived ideas through their already existing commitments and interests and their ability to implement or enforce them by way of their existing power capability’. Greenwood and Hinings (1996: 1048)

Institutional theorists declare that regularized organizational behaviors are the products of ideas, values, and beliefs that originate in the institutional context (Meyer & Rowan 1977). The institutional context, as an area of influence, provides ‘templates of organizing’ (Dimaggio and Powell 1991). Greenwood and Hinings (1996), taking organizational arrangements in terms of templates, provides a definition of radical and convergent change. Convergent change occurs within the parameters of an existing template. Radical change, in contrast, occurs when an organization moves from one template-in-use to another. They have also established that radical change is problematic because of normative embeddedness of an organization within its institutional context. For dissemination of a new practice, while technical performance requirements are more important in the early development of an organizational field¹, institutional pressures become more salient in later stages. By definition, ‘institutions are firmly rooted in taken-for-granted rules, norms, and routines’ and are so powerful that organizations and individuals are apt to automatically conform to them (Dimaggio and Powell 1991).

Greenwood and Hinings (1996) further emphasized the importance of the structure of the institutional context for understanding organizational change, i.e., the extent of tight coupling and the extent of sectoral permeability. Regarding

¹ ‘the notion of field connotes the existence of a community of organizations that partake of a common meaning system and whose participants interact more frequently and fatefully with one another than with actors outside the field’ (Scott 1994: 207-8)

tight coupling, sectors usually have been perceived as having clearly legitimated organizational templates and highly articulated mechanisms for transmitting those templates to organizations within the sector. Tight coupling, in other words, refers to the existence of mechanisms for dissemination and the monitoring of compliance combined with a focused and consistent set of expectations – the degree of which the participants are psychologically and economically locked-in.

Institutional fields vary in their insulation from other fields. Some fields lack permeability (i.e., they are relatively closed to or not exposed to ideas from other institutional arenas). Other fields are more open and thus more likely to permit variation and change. As exemplified by Greenwood and Hinings (1996) ‘members of accounting firms inevitably work in several fields (by consulting or by audits) and become exposed to and potentially influenced by the ideas prevailing in those fields’ (p. 1030).

At the backdrop of institutional perspective, and as a way to understand both persistence and change, Greenwood & Hinings (1996) emphasized the importance of scrutinizing internal organizational dynamics. An organization is conceived as being composed of a number of groups divided by alternative conceptions, value preferences, and sectional interests. Central to their perspective is the role of “interests” and “value commitments”. Groups within the organization are not neutral and indifferent to attempts of change and other groups. Groups within the organization have alternative way of viewing the purposes of their organization, the ways in which it might be appropriately organized, and ways in which actions might be evaluated. Groups also seek to translate their interests into favorable allocations of scarce and valued organizational resources. A potential pressure for change and/or inertia, therefore, is the extent to which groups are dissatisfied with how their interests are accommodated within an organization. Accordingly, four possible scenarios were identified as to the position of groups in relation to their preference to support either the existing ‘Template-in-use’, the institutionalized and dominant way of organizing, or the new proposed one:

- status-quo commitment, in which all groups are committed to the prevailing institutionalized template-in-use
- indifferent commitment, in which groups are neither committed nor opposed to the template-in-use
- competitive commitment, in which some groups support the template-in-use, whereas others prefer an articulated alternative
- reformative commitment, in which all groups are opposed to the template-in-use and prefer an articulated alternative.

In addition to interests and value-commitments, *the precipitating dynamics*, change can occur only in conjunction with an appropriate ‘capacity for action’ and supportive power dependencies, *the enabling dynamics*. The operation of values and interests can be conceptualized and understood only in relation to the

differential power of groups. Groups use favorable power dependencies to promote their interests, through their ability to influence organizational change. The second enabling dynamic, capacity for action, is the ability to manage the transition process, and can be explained as to the existence of sufficient understanding of both the new conceptual destination and the means to get to that destination.

The concepts presented here from Greenwood and Hinings (1996) was chosen as an analytical approach to this research. As presented briefly, the principal issue addressed by the framework is the interaction between organizational context and organizational action. This framework is suitable for the domain of this study, a public health care system of a low-income country, where many developments in policy and strategy were pushed to the front of the normative stage often from external forces (de Kadt 1989).

Research approach

In order to obtain a deeper understanding of the phenomena being investigated, an interpretivist research approach was adopted whereby the researcher “attempts to understand the phenomena through accessing the meaning the participants assign to them” (Orlikowski and Baruodi 1991, p.5).

We choose the case study method as it is appropriate for the domain under scrutiny and fits with the conceptual framework selected. As suggested by Greenwood and Hinings (1996) detailed case studies are appropriate, first, as the concepts presented in the framework are difficult to measure (interest, power), which tend to be highly sensitive to context in their operation; secondly, change takes place over a lengthy period of time, which needs follow-up; and thirdly, organizational change occurs in ways that are iterative and close attention to such iterations is required to truly understand the dynamics.

Research Setting and Data Collection Methods

The case study in this paper was carried out at Tigray regional health bureau (RHB) - one of the nine regional states, which together with two special municipalities constitute the Federal Democratic Republic of Ethiopia. The major actors involved in the integration process were Health Information Systems Program (HISP) and the various departments in the regional health bureau, mainly Planning and Programming (Planning); Malaria and Other Vector Borne Diseases (Malaria), and Disease Prevention and Control (Disease Prevention).

HISP is a large-scale research initiative that operates as a global network within the health care sector across a number of developing countries including South Africa, Mozambique, India, Tanzania, Ethiopia, Malawi, Mongolia, Cuba, Nigeria, and China (Braa et al., 2004). The aim of HISP broadly is to strengthen

process of design, development, and implementation of HIS, and building the capacity of health workers to use information more effectively, supported by ICTs. Through collaborative efforts among researchers in HISP, the District Health Information Software (DHIS) was developed (Braa and Hedberg, 2002) to assist health workers and managers in the process of analyzing and presenting health routine data in a simplified, meaningful, and useful format for making informed decisions.

HISP-Ethiopia is initiated as a result of the collaboration of the Department of Informatics, University of Oslo and the Department of Information Science, Addis Ababa University. This author has been member of the HISP-Ethiopia since the beginning of the collaboration.

In Tigray, the author had participated in meetings representing HISP-Ethiopia from the very initial discussions to establish collaboration and subsequent meetings to develop strategy for the integration initiative. Trips to the region were made in July 2003, January 2004, June-July 2004, and April-May 2005.

In July 2003 and January 2004, the author with another HISP member traveled to the region for situational analysis and to discuss the possibility of collaboration. In June and July 2004, the author with other four members of HISP was involved in the development of a strategy of integration of the fragmented systems by participating in meetings with the working group members constituted from all concerned departments in the regional health bureau. In April 2005 a follow-up visit was made by the author to see the status. In total, the region was visited four times by the author, each time staying for about three weeks.

The study was performed using the participant-as-observer role. Semi-structured interviews and document reviews were also used in the study. Interviews were conducted with 24 individuals with capacities from members of top management of the bureau, experts in each program at the bureau and district levels, and health workers in health facilities. Each interview conducted took an average of one hour. Respondents were selected on the basis of their expertise and involvement in the study's subject. Table I shows groups and number of people that had participated in the interview.

Group	Number of Informants from each group
Health Bureau Management (Bureau and Department Heads)	4
Department level HMIS Responsible Individuals	8
District Health Office Heads	2
District level Program Experts	6
Practitioner nurses in health facilities	4
Total	24

Table I - Groups and number of informants

Observations were made in the field sites by taking field notes on the activities of individuals in the research site from health facilities to departments at the bureau level to understand the various information flows, the existing infrastructure, the relationships between the staff, and the kinds of artifacts that were being used in the collection, aggregation and reporting of data.

Documents related to the overall health sector including the health policy and Strategy (HSDP) documents, sector wide as well as HIS related evaluation reports, and regional health profiles were consulted as part of the study.

The Case Study

Background

Tigray is one of the regional states in Ethiopia located in the northern part of the country. The total population of the region was estimated 4.1 million for 2004 and 85% was rural engaged in subsistent agriculture dispersed along an area of 54, 572.6 square kilometers. The region while has been improving in local governance and social services, access of the population to basic primary health care services has been limited.

Since the change of governance of the country in 1991, power has been decentralized to lower levels. Under the current setup, Tigray has been divided into five zones, which in turn are divided into 34 *woredas* (districts), and then further into *tabias*, the lowest level of government. While zones are currently being dismantled, *woredas* and *tabias*, together with the regional government, each have their own system of administration and elected assemblies called *baito*, which provides the basis for grass roots level participation in the decision making process.

The health care system in Tigray is currently managed through two levels of administration and a four tier health care services delivery network. Administration of the health care system comprises thirty four *Woreda* (district) Health Offices at the lower level, and the Regional Health Bureau (RHB) at the higher level. The health service delivery system is organized into a four tier network. The most peripheral level is the Primary Health Care Units (PHCU) comprising health posts (HPs) and Health Centers (HCs). The next level of health facilities in the tier are district hospital, zonal hospitals, and specialized referral hospital. The region has 7 district hospitals, 5 zonal hospitals, 35 Health Centers, 182 Health Stations, and 121 Health Posts (FMoH, 2004). The Health Stations have said to be upgraded to Health Centers as there is no such health facility type in the four-tier system.

Access, and use, of the population to a basic package of primary health care services has been limited. The major constraints to expand services include shortage and quality of skilled human resource at all levels; and financial constraints for capital as well as recurrent costs (FMoH 2001). In 2003/4, physician to population ratio in Tigray was 1:64,613 and that of nurse to population ratio was 1:4,147 (TRHB 2004), one of the lowest in the world, even from Sub-Saharan Africa.

Annual per capital spending on healthcare services is very low despite the significant support from donors. In 2004/5, 64.9% of the total capital and recurrent budget was allotted from the government treasury, while the rest, 35.1% was obtained from donors (TRHB 2004). As per the HSDP of the same year, average budget allocation per person per year was just about 3 USD and actual expenditure was 2.75 (USD), among the lowest in the world.

The remaining part of this section presents the major three departments involved in the integration process, levels of fragmentation, and the integration initiative.

The Three Core Departments in the bureau

The Malaria and Other Vector-Borne Diseases Department

The Malaria department is responsible for prevention and control of Malaria and other vector born diseases in the region. Before its integration into the health bureau as a department in 1993, it was an independent organization (Ghebreyesus et al 1996). From the outset, the department has developed a Community-Based Malaria Control Program (CB-MCP) as a strategy to rollback malaria in Tigray. The program, which was supported by financial and technical support from the WHO and other donors, comprise HIS and operations research as its core elements (WHO 1999).

The department has developed its own information system adopting the WHO's guideline for evaluation of malaria control program. The system's data include both routine data collected from health services, by Community Health Workers (CHWs) and health facilities, as well as from different surveys conducted by the department such as repeated mortality and diagnostic performance surveys. The department also has developed geo-referenced database of population settlements containing data on the location and name of CHW sites, population data, and the type of health services. Accordingly, Epi Info and Arc View software were highly used in the department to manage their data. The department's core employees were well-educated professionals (Biologists, Physicians, and Public Health Specialists) further graduated with advanced degrees in Epidemiology, Applied Medical Entomology, Parasitology, and Public Health during their stay in the department. Data from the malaria control program had been used to support their graduate research work. During my visit in July 2004, two MSc holders with malaria related specializations and one BSc holder in Biology were the core group in the department. Employees assigned for malaria related responsibilities at district health offices, health facilities and the community health workers alike were also trained as per their levels.

The department's achievement through its Community-Based Malaria Control program is well acknowledged. According to the WHO's Roll Back Malaria program director, "the experience of Tigray highlights critical elements of RBM action within malaria-affected communities". Regarding the outcome of the program he said "... the program has evolved as a social movement, leading to improved access to care for poorer villages who have limited access to peripheral healthcare facilities." 40 % reduction in under 5 deaths were reported in the early years (1994-1996) of the program. The program, while has been supported by donors, also sustained within the bureau's budget when funding was interrupted as a result of donors position on the Ethio-Eritrea war.

The HMIS Unit (under the Planning and Programming Department)

The HMIS unit was established under the Planning and Programming Department in 2001 with the objective of strengthening the bureau's HISs as per the HSDP. The unit since then has developed ICT infrastructure and has strengthened part of health facility's routine data collection function. This unit is equipped not only with the necessary hardware and office equipment, but also provided the majority of district health offices (30 of the 34) with Computers for HISs purposes. It has also managed to subscribe internet access for all the departments in the bureau, hospitals and the majority of district health offices with a dial-up subscription. The unit also provides a liaison between the bureau and external entities in ICT related issues.

Since its establishment, the unit's system mainly deals with health facility level morbidity (incidence of a disease) and mortality (death) data and laboratory

diagnostic data, which is received monthly from the district's 'health services expert' and 'statisticians'. The unit also receives district level aggregate data annually from the other departments for the purpose of generating the regional health profile. The unit so far has produced three consecutive annual health profiles of the region, which provides visibility for the unit as well as the region by outsiders – other regions in the country and donors. The occurrence of discrepancy of data among the HMIS and the other departments were recognized on morbidity and mortality. The unit mainly uses Epi Info and Arc View software for data handling, and has about seven employees of which only the head has first degree in health related field. All the staffs have training on MS Office applications and Epi Info.

Disease Prevention and Control department

Disease Prevention and Control department is the nucleus of the health care system which was in existence since the establishment of the health bureau. The department is organized into five units: Hygiene and Environmental Health; Maternal and Child Health (MCH); Information, Education, and Communication and Health Extension Package; Epidemiology and Surveillance; and Tuberculosis and Leprosy. Each of these units constitutes individual or a team of experts dealing with specific program or disease(s). For example, the MCH unit has an expert responsible for EPI, and another for Maternal and Family Planning related functions. Similarly, Epidemiology and Surveillance unit has an expert for HIV/STI and another for 'Integrated Disease Surveillance and Response' (IDSR). The IDSR, while aims to improve the availability and use of surveillance and laboratory data for control of diseases of epidemic potential, of public health importance, and those targeted for eradication; achieved little of 'integration' with other vertical programs even with in the same department such as EPI, HIV/STI, and tuberculosis.

Despite the inclusion of almost all health programs both at the regional & district levels into the DPC department and are managed by one person, most of the programs operate in isolation each having its own strategy and institutional support mechanisms from the environment - the FMoH, the WHO and other Aid agencies involved in the sector. Each program accordingly has its own system to record data. While different data collection formats are used by each program, either Epi Info or MS Excel, are used for data storage and analysis. However data for some units are represented at the health facility level, while others store district level aggregates. The experts in this department receive data from the corresponding district level 'expert' assigned for a specific program. While the majority of the experts at the department level are highly qualified, professional Medical Doctors, district level staffs are usually paraprofessionals. During my visit in July 2004, the experts for EPI, MCH, and HIV/STI in the department were

medical doctors, while IDSR was lead by health related professional assisted by a couple of data entry clerks.

HISs in Tigray

Existing HISs in the bureau are highly fragmented and exploits ICTs minimally. The fragmentation can be explained from three interrelated dimensions: existing paper-based data recording formats (instruments) that are in use in the collection, compilation, and reporting of data; data flows across the health care system; and software that are being in use by departments to store and analyze data. Figure 1 shows partial data reporting channel across and around the three major departments. The size of the data stores in the diagram has no meaning.

As is well recognized by the bureau, and was observed during the filed study, data collection formats are too many (more than 250). Data flows in the health structure are also problematic. In the very source of data are health facilities and community level health workers (CHW). Once data are collected and aggregated according to the pre-defined formats, then are forwarded to respective District Health Office experts who do further aggregation across the different facilities and send to the Regional health bureau departments, which in turn send aggregated data further to the FMoH. At all levels, program experts/units route their reports to the higher level through 'statisticians' or the HMIS unit.

The third source of fragmentation is in the type of software as well as the level of data representation used by each program/departments. Epi Info and MS Excel are mainly used in the departments and/or units. Data are stored in these systems with different formats and levels of aggregation. While part of the data is stored at the level of health facilities, others preferred to store the aggregate at the District level.

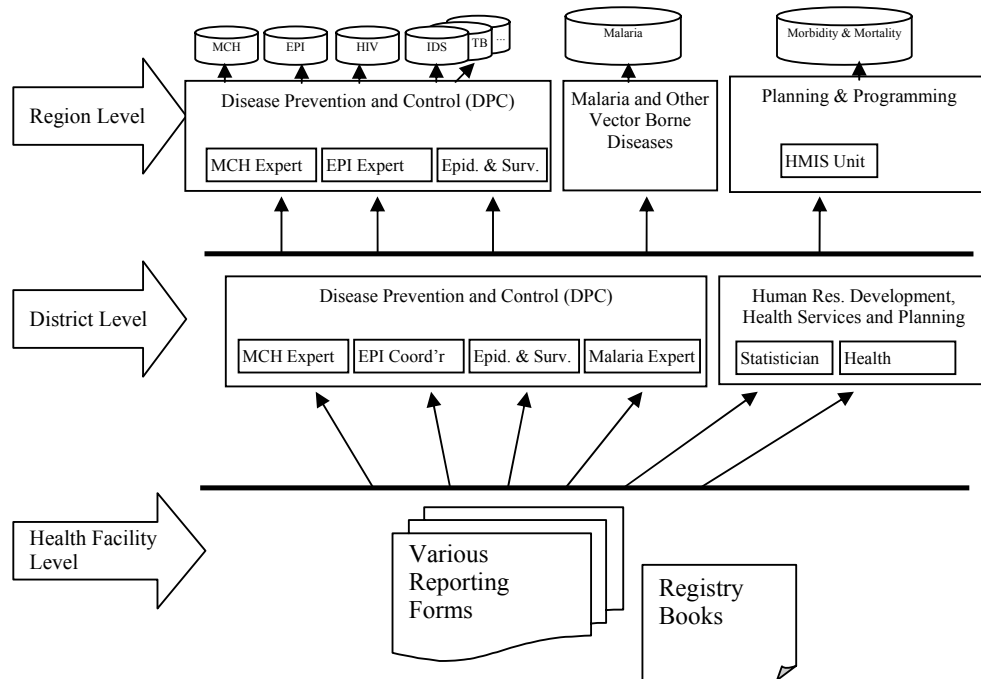


Figure 1. Partial Data Reporting Channel within the Regional Public Health System

The Integration Initiative

This case study is focused on the attempt of integration of the program specific information systems in Tigray Health Bureau. A change from the fragmented program specific information systems to an integrated system supported by a database application.

In recognition of the problems enumerated earlier and as an opportunity for collaboration, HISP provided an offer for collaboration, which was then followed by a request for proposal by the health bureau head. Accordingly, a proposal was submitted by the HISP team to the bureau head, which was followed by a scheduled presentation and discussion with members of management (department and bureau heads) and HMISs related staffs. The proposal then was accepted by the management.

Five key areas were singled out for consideration (from activities that could be carried out immediately, to issues that need long term commitment). These are:

- defining data and reporting requirements;
- software customization;
- capacity building;
- re-organizing work and information flows; and

- organizational support mechanisms towards institutionalization of good practices.

Each of these issues were then discussed in respect to specific mechanisms on how to address them, resources required, and time frame for action, when and if appropriate. The proposal, among other things, emphasized the importance of an all inclusive working group from all concerned departments and with capacity and authority to make required changes.

Accordingly, a working group was formulated comprising of experts from the different departments. The team members were elected because of their role in their host department - involved in data collection, analysis and reporting. All the departments in the bureau were represented in the working group. The educational backgrounds of the working group members include medicine, environmental health, biology, and community health. The Planning department head was assigned as a coordinator for the committee as well as liaison with the HISP consultants.

The analysis part of this paper describes the organizational context and the interaction and response of the different groups within the health bureau, specifically members of the three major departments depicted earlier.

Analysis and Discussion

The progress of the integration initiative of the fragmented ISs in the health bureau had been influenced by both external and internal context. Rather than simply listing the constraints for the progress of the integration process, the framework by Greenwood and Hinings (1996) is used for the analysis and classification of the research material. This section is organized and presented into environmental and intraorganizational context.

Environmental Context

The environment in which the integration process was situated could be seen from two perspectives: market and institutional context. Market here is understood as ‘the demand for services together with aspirations and understandings of the populations that elements of the health system serve’ (Hinnings et al. 2003). The demand for all kinds of healthcare services in Tigray is unquestionable as access to such services is very much limited. Only about half of the population has access to PHC services (TRHB 2004). However, the demand for Malaria services is relatively high and articulated. As noticed by the Director of the RBM of the WHO, ‘the people of Tigray perceive that malaria is a big problem’ and they ‘want help to tackle this problem’ (WHO, 1999). Response was accordingly needed for the ‘extra demands’ that ‘are placed on government officials’ (ibid). The demand could be attributed to the malaria

burden of the region. ‘Almost 75 percent of Tigray Region is malarious, and about 56 percent of the population lives in malarious areas’ (ibid). Expectedly, malaria is the leading cause of morbidity and mortality in the region (TRHB 2004). Such a demand for malaria services has influenced the way the malaria department is structured and resourced within the region.

Two issues are emphasized from the institutional context: the level of maturity/development of the health sector field; and the permeability of the health sector to other fields. Regarding the level of development of the health sector, there had been a strong vertically organized health care service delivery and management for almost half a century (Kloos 1998, Ghebreyesus 1996). This was embedded in a deeply-rooted authoritarian/hierarchical value both at the public sector (Clapham 1990; Kloos 1998) and the society at large (Levin 2000; Bauer 1977). Although the vertical programs are ‘integrated’ into a single organization and most of them into one department since 1993, the ways operations are performed reflects the persistence of the status quo. As reported in the HSDP I evaluation (FMOH 2002), the existing arrangements are being reproduced as usual:

‘... The timeliness and completeness of HIS reporting remains a weakness, and such delays contribute to the failure (at all levels) to use data as the basis for informed decision-making in planning and management. In addition, parallel reporting mechanisms persist, with programmatic and donor-supported initiatives resulting in multiple reporting formats and an increased administrative workload.’ (FMOH 2002, p. 16)

‘... the overall quality of both routine and periodic health sector reporting has been very weak. In part this is due to the parallel systems developed...’ (FMOH 2002, p. 20)

Specific health programs often get technical resources through guidelines and strategies on how to carry their activities from external actors such as the WHO’s Roll Back Malaria, Stop Tuberculosis, and the Global Alliance for Vaccines and Immunization (GAVI) (FMOH 2002).

‘Ethiopia has adopted several of the global strategies, notably Roll Back Malaria (RBM), and is also benefiting from funding for tuberculosis activities through the Global Fund to fight AIDS, TB and Malaria (GFATM). In addition, the country is a recipient of support through the Global Alliance for Vaccines and Initiatives (GAVI).’ (FMOH 2002, p. 25)

The support each program is getting from donors, both financial and technical, reinforces existing organizational arrangements. While financial support from the WHO allows the Malaria department to provide data collection and reporting formats, lack of such resource constrained similar activities for the other services:

‘costs of reporting materials and chloroquine is covered by the regional government supported by WHO funds. Financial constraints faced by the Health Bureau have prevented distribution of additional drugs and materials needed for the general activities for CHWs’ (Ghebreyesus et al. 1996, p. 149)

Such institutional support mechanisms could be considered as a dissemination mechanism for maintaining program specific hierarchical arrangement. The alternative way of organizing, integration of the vertical programs, on the other

hand, while has been in the discourse since the Alma Ata globally (de Kadt 1989, Braa et al 2004), and in the nations' policy documents (TGE 1993, FMOH 1998) for more than a decade, is still suppressed and lacks institutional support mechanism (FMOH 2001). The capacity of the Planning Department - which is responsible for coordination of the HSDP in general, and that of HMIS in particular - is highly limited. 'There is a shortage of staff with the right skills and expertise' in the department, and the existing staffs are highly overloaded. (FMOH 2001)

The second parameter used from the institutional context is the permeability of the healthcare sector to other fields. As will be demonstrated shortly, the health sector is impermeable to other sectors including Systems development (ICT related fields), management or organizational studies. Two markers are used to support this argument. The first indicator used is the professional mix of staffs in the health sector. The sector is almost exclusively managed by professionals with background in medicine and health related disciplines, and thus has more or less similar normative orientation. As depicted in the health and human resource profiles (FMOH 2004, TRHB 2005) and was confirmed from the informants, very few professionals from other fields exist in the sector, and often in positions outside the core functions of the sector. As an example, despite the inclusion of the development of an appropriate HMIS as a major component in the policy and strategy documents (FMOH 1993, FMOH 1998), there are no professionals in systems development related disciplines such as computer science, computer engineering, or information systems in regional health bureaus. Neither did the regional health bureaus invite external expertise to fill the gap except one incident (ESHE 2003). At the FMOH, there are a couple of Systems related professionals in the stock of human resource who are overloaded. Work experiences and exposures of the staffs in the sector are also highly limited to the government health services.

Another indicator that shows the impermeability of the sector is the number, and composition of participants, of workshops conducted to discuss health management information system in particular and ICTs in the health sector in general. Primarily, there have been less than a handful of workshops conducted so far, the majority being in the last couple of years. The increase in the number of such forums being a positive sign to the development of the area, the participants were highly limited to staffs of the HMIS unit and the parent department, the Planning. Not only professionals from other disciplines such as systems development, management or organizational studies, were highly constrained, but also health professionals from other departments were hardly participated.

Intraorganizational context

The integration process was highly affected by both the varying interests of the groups within the bureau as well as the capacity of the coordinating/leading unit. In this section, the three departments briefly introduced earlier and the bureau's top management (the bureau head and his deputy) positions regarding the integration initiative is presented.

The top management of the bureau, acknowledging the problems in the existing system including the constraints of professionals in the area and the need to exploit the expertise of the HISP group, facilitated the initiation of the project. A meeting was organized by the bureau head to discuss a pre-distributed proposal for the initiation of the project and to view demonstration of software by the HISP group that has been in use in other countries. The workshop was followed by internal meeting of staffs and heads of departments and concluded by constituting a working group that took responsibility to implement the strategy as per the proposal. Despite such active role in the initiation of the project, the bureau head had some concerns: 'whether it is appropriate to initiate the integration process from regional health bureau rather than from the federal ministry of health'; and 'whether it is feasible to initiate the process with the existing capacity'. However, broadly speaking, the top management held open to see what could be reaped from the initiative.

The precipitating dynamics

The position of the HMIS unit towards the integration initiative was not consistent all along. Initially, the unit considered the initiative as a threat for its alluded recognition - one of the 'successful' HMISs in the country. During the initial discussion with the HISP group the HMIS unit head was vocal to display his discontent and persistently discouraged any engagement towards collaboration (this is in contrary to the assignment given to him by the bureau's top management):

'There had been many researchers who came and inquire lots of things about our system. None of them had provided us a feedback that is helpful to improve our system. They came here just to fulfill their research interests. I couldn't justify the time I spent on discussing with such researchers in my performance evaluation reports.' (HMIS Unit Head, 2004)

And when informed of the nature of the proposed operational research approach, as having strong practical component including software development and training from academics and experts that have been engaged with similar systems in other countries, he responded:

'We have adequate system in the bureau that has got acceptance by all stakeholders. We have developed our system with lots of hardship staying in the rural districts for weeks. We had reallocated district health offices to facilitate access to electric power and telephone lines, even acquired generators for those without such access, and setup computers with internet connection for the majority of districts. We have managed to produce annual health profile of the region with a reporting performance of almost 100 percent from district health offices and

health facilities. Currently we are working in revising the different data collection formats to remove duplication and unnecessary variables.’ (HMIS Unit Head, 2004)

However, despite the articulated discontent of the HMIS unit head, the initiative was progressed by a step through the establishment of a working group. Shortly after the establishment of the working group, the HMIS unit head left the bureau and was replaced by his deputy, who was a member of the working group. The new unit head seems comprehended on the possibility of getting legitimacy as a bureau level unit if the initiative becomes successful. However, the HMIS unit staffs were skeptical about other departments’ engagement towards the implementation of the integrated approach:

‘the departments link their ownership of the data and their parallel relationship with the higher level with the funds they get, therefore I do not think they would accept the idea of a unified systems easily’ (HMIS Unit Head, 2005).

Furthermore, the new HMIS unit head was looking for opportunities for training and education as a result of the initiative. In a discussion held with HISP members, the head has emphasized ‘capacity building is the priority of the bureau in this initiative’.

Similarly, the position of Disease Prevention department staffs for the initiative was positive as they were dissatisfied with the existing arrangement. The staffs were unhappy about both the ‘unwarranted’ claims of the HMIS unit as a bureau level unit and the isolated position of the Malaria department in the health system. A member of the disease prevention department emphasized the capacity of the HMIS unit staff, if they have to be responsible for an integrated system:

‘they [the HMIS unit staffs] do not have a computer specialist. They are all health workers with little computer training. I doubt if they can manage and support a bureau level system’ (Health Bureau Staff, 2005)

Similarly, some members of the disease prevention department were unhappy about the special position of the malaria department. This issue was even considered for reorganization. Earlier attempts made to position the Malaria department under Disease prevention had failed after the bureaus’ management had decided to do so. One staff attributed the ‘failure’ to the ‘lack of determination from the top management to enforce what has been decided’. Another staff emphasized the difficulty to take risk in disrupting a well functioning department dealing with a sever public health problem into unnecessary conflict.

The professional staffs in Disease prevention, however, considered the initiative as a positive step towards solving the existing problems resulted from fragmentation and lack of expertise. The physicians working in this department in particular were unhappy wasting their time in aggregating and preparing reports. As stated by one informant, ‘a well functioning computer program could be helpful to reduce the time we are spending on data analyses.’

The Malaria department staffs, on the other hand, had little interest in the integration initiative. They were satisfied with the existing arrangement. They have long improved their departmental ISs significantly. However, they have assigned a staff member in the integration process to comply with top management's decision. The staffs in the malaria department emphasized the acute shortage of skilled manpower in the health bureau and further questioned the recognition given to the activities of data collection and analysis. As one member of the malaria department underscores:

'The level of staff you have assigned, or what you would like to assign, shows the level of recognition you have given for the job. You couldn't expect an accurate and reliable data with the existing manpower at all levels of the system. The necessary recognition should be given for the task and resources need to be allocated accordingly' (Health Bureau Staff, 2005)

The capacity of the HMIS unit was also questioned:

'the HMIS unit basically keeps the few ICT related utilities the bureau have, mainly software such as MS Office and Anti-virus. As far as health related data is concerned we are providing them an aggregated data at the end of each year so that they could compile and generate the annual health profile of the region.' (Health Bureau Staff, 2005)

To summarize, there is a difference in the level of dissatisfaction or otherwise in the existing arrangement among the groups considered in this study. Unsurprisingly, the Malaria department prefers the existing arrangement [[, as that is not only because they have a well functioning system and there was a severe lack of expertise in the other departments, but also they were not convinced of the any way of doing in their own.]] In the contrary, the other two departments at least partly preferred the newly proposed arrangement as they are dissatisfied with the existing arrangement. Thus the value-commitments could be classified as *competitive*, in which the Malaria department group supports the template-in-use, whereas the other two – Planning (HMIS) and Disease Prevention - groups more or less prefer the articulated alternative. Finally, it should be noted here that, the categorization of staffs into groups isn't to suggest homogeneity among group members, but to highlight the dominant position within the groups.

The enabling dynamics

Interests and values are precipitators of change, when interacted with normative pressures operating in the institutional context, creates pressure for change (Greenwood and Hinings 1996). However, such pressures require enabling capacity and power to realize change. The responsibility to coordinate and lead the integration process in particular, and improving the HISs in the sector in general (HSDP 1998), is bestowed to the Planning Department, and the HMIS unit that was established for this purpose under the department.

The Planning Department, or the HMIS unit, however, has neither sufficient understanding of the new conceptual destination nor how to go about it.

Integration often involves reengineering of business processes. Work procedures likely have to be redesigned. In the case study, however, the specific components constituted in the integration and the possible effects the process could bring about on the organizational structure and/or task assignments were not specified adequately. The process by and large was perceived narrowly, defining or refining the data collection formats and the development/customization of software besides distributing computers to district health offices. The HMIS unit head showing a compiled data reporting formats of all the departments, during the initiation of the project, stated that:

‘We have already collected all the data collection formats that have been in use by the departments. We will remove redundancies and unnecessary variables so that we could have a refined and unified data collection formats. Once we finish this task, then we will be easier to ...’ (HMIS Head, 2004)

Furthermore, with lack of education and experience in project/technology management, and limited exposure to professionals with such expertise, the gap in know how is highly visible.

Furthermore, the Planning Department, and the HMIS unit, did not have the required authority and power to enforce the integration initiative. The department has neither the authority to coerce (through incentives and sanctions) nor the technical expertise (knowledge) to persuade and influence the other departments to support the initiative.

Concluding Remarks

This paper has discussed issues arising from both the internal organizational group dynamics and the broader environment in light of the integration effort of the fragmented HISs within a regional health bureau. Interests and values are precipitators of change from within the organization when interacted with normative pressures operating in the institutional context, creates pressures for change. Such pressures, however, could likely be realized if those who support the new arrangement are augmented with favorable capacity and power for action.

Despite the recognition for the existence of problems in the fragmented systems (Kloose 1990, TRHB 2004, FMoH 2002), integrating these systems in the health sector seems far from realization. One constraint is the degree of exposure to alternative arrangements or ideas, which may facilitate a shift in actor’s consciousness. Otherwise staffs reproduce existing institutional arrangements and related thinking pattern.

Similarly, the existence of dissatisfaction by some group members in the existing arrangement is not a sufficient condition for change. As have been established for decades, IS development (particularly that affects multiple units within organizations) is an intensely political process, as is a technical one, and organizational mechanisms are needed that provides the responsible leaders with

authority and resources for negotiation. However, the deployment of suitable professionals shouldn't be overlooked.

The preliminary result presented in this paper indicates that the framework developed by Greenwood and Hinings (1996) can provide at least a partial account on the likelihood or otherwise of change resulted from the institutional context and from the intraorganizational dynamics. As institutional/organizational fields vary as to their level of maturity and their permeability to other fields, researchers need to examine such factors in studies of organizational change. Similarly, analysis of organizational change should recognize differences among groups within organizations as that also affect the change process.

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