

Power Tensions in HIS Integration in Developing Countries: The Need for Distributed Control

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Abstract

As part of health sector reform, most developing countries are in the process of standardizing and integrating various vertical reporting systems. Nevertheless, the pressure resulting from the vertical systems supported by donors renders the integration goal challenging and unachievable. While studies have argued for the heterogeneity of interests and donors' multiple needs as the major causes, this paper argue for more critical analysis of the problem. The paper contribute by arguing for the need to understand the main actors involved, in terms of their resources and rules as they are implicated in HIS integration. Using an empirical case and Structuration theory concepts, we identified dialectic power relations between the actors resulting from control of resources and rules. The need to build shared meanings of the integration process through communication approaches; and to distribute control of the integrated HIS, facilitating 'tapping on' the resources available to the actors is discussed.

Keywords

Standardization, Health Information Systems, Integration, Vertical Programs, Structuration Theory

Introduction

In this era, popularly acclaimed as an information society age, use of information in the service sectors is seen as a factor to improve efficiency and effectiveness of service provision. In the health sector, health information guides mobilization and allocation of resources, prioritization of health programmes and research, and improve efficiency and effectiveness of health programmes (Kanjo et al., 2009). Use of health information in low-income countries with high disease burdens is perceived as a mechanism towards optimization of resources and for the management of interventions geared towards reversing the diseases trends. However, these interventions have attracted multiplicity of so called development partners/donors operating with a condition of 'proper' management of their funds through quasi-independent programs called vertical health programs. The programs maintain separate and uncoordinated information system alongside the national HIS. Consequently, the HIS in most countries is rendered dysfunctional, fragmented and unable to provide the much needed health information (Chilundo, 2004; Braa and Humberto, 2007; WHO, 2006).

As a remedy, most countries are standardizing and integrating the HIS as part of the broader health sector reforms. Whereas some countries have managed to standardize and integrate some of the vertical programs in the national HIS (Braa et al., 2005; Haulage et al., 2005), keeping the vertical programs rely and use the new system has proved challenging (Haulage et al., 2005). This makes the goal for HIS integration illusive and unattainable with fragmentation creeping back in the picture, even before the closure of the project. Though a number of research studies on the HIS in developing countries, not many of them have critically analysed the issue of fragmentation after integration. Some few studies have argued for the national HIS not meeting the data needs of the health vertical programs, rigidity of the national systems where standards are 'cast in stone', bureaucracy in incorporating new program's requirements in the existing system, multiplicity of data needs posed by donors on the vertical programs (Sheikh, 2005; Aanestad et al. 2005; Chilundo, 2004). To contribute to this, the paper emphasize the need to understand the two main groups of actors involved in the process (i.e. the national HIS authorities and the vertical programs supported by donors) in terms of the resources and rules available to them; and their implication in the standardization and integration venture.

Our focus being the need to analyze the relationship between the national HIS authorities and the vertical programs in terms of their resources and rules, we find Structuration Theory (ST) concepts relevant for this respect. According to Giddens, actors draw on allocative and authoritative resources to mediate their actions (Giddens, 1984). Allocative resources refer to material objects which actors draw upon to get things done (redesign a new tool, exert control over others). On the other hand, authoritative resources refer to non-material factors (such as status, formal authority or hierarchical position) which enable command over other human beings. The main actors in the context of our study carry with them both allocative and authoritative resources as they engage in the process of standardizing and integrating the HIS. Our argument is that, these resources generate power which underpins the actors' ability to effect changes (transformative capacity) in the context of HIS integration which ultimately challenge the whole process, rendering it ineffective (ibid). Therefore, our paper strives to meet the following objectives (1) to analyze the power relations that exist between the two main actors resulting from the ownership and control of resources and its implication on the HIS integration (2) to draw on the case and propose strategies to deal with the challenges.

The empirical underpinning is the ongoing effort to standardize and integrate the HIS in Zanzibar, as part of the broader healthcare system reforms. Supported by Danish International Development Agency (DANIDA) the HIS restructuring

project is done within the Health Information Systems Programme (HISP), which operates in many other developing countries (Braa et al., 2005). The rest of the paper is organized as follows. In the subsequent section we present concepts from Structuration theory forming the basis for analysis and discussion. The research context and the methodology employed are presented next, followed by the case description. Analysis and discussion of the research findings is then set forth. The paper ends with a conclusion section presenting implications of the study and final remarks.

Structuration Theory Concepts

Giddens developed structuration theory (ST) as a general theory of social systems. In the information systems (IS) research, ST has been used in theory development and analysis of empirical case studies on organizational and social issues related to IS implementation and use. Kouroubali (2002) used the theory to study implementation of information system in a health care environment; Chisalita (2006) used ST to understand use of IS technology in a public sector. In this paper, we employ ST in a healthcare environment flooded with multiplicities of vertical HIS supported by donors.

Structuration is a social process that involves reciprocal interaction of human actors and structural features of the organization (Giddens, 1984). ST aims to explain social practices across space and time by viewing actions and social structures as linked by their interdependency. Social structures are defined as rules and resources in the human mind. When acting in a social situation human actors draw on the resources and rules between them which facilitate or constrain their actions. Therefore, rules and resources mediate human actions and in their use they are continuously reaffirmed or changed by human agents. Giddens identifies three dimensions of structure, which he terms signification, domination and legitimation linked with corresponding dimensions of agency, described as communication, power and sanctions. The interaction (agency) is however, mediated by interpretive schemes, facilities (resources) and norms respectively.

When human actors communicate in interaction they draw upon different interpretive schemes, defined as “stocks of knowledge” about what actors are doing and why they are doing it. Actors employ these interpretive schemes in order to make sense of the interactions, to understand them. By employing the interpretive schemes they produce and reproduce structures of *signification* or meaning. Giddens identified two types of resources - allocative and authoritative resources. Allocative resources refer to material objects which actors draw upon to get things done (e.g. design a new data tool standard, exert control over others). On the other hand, authoritative resources refer to non-material factors (such as status or hierarchical position) which enable command over other human beings. These resources generate power which underpins a person’s ability to effect change (transformative capacity) in his or her social environment. (Callinicos and Giddens, 1985) defined power as the capability of the actor to intervene in a series of events so as to alter their course. As such it is the “can” which mediates between ‘intentions and want’ and the actual realization of the outcomes sought after (ibid). The ability of human actors to draw on resources to exercise power over other actors constitute to organizational structures of *domination*. Nevertheless, there is always a possibility for the other actors, to whom power has been wielded to act to change a particular structure of domination, leading to what is referred to as the dialectic of control. With the dialectic of control, Giddens argues that, there is always some resources available to humans with which to act in ways that counteract or offset the effect of a social pressure.

“all forms of dependence offer some resources whereby those who are subordinate can influence the activities of their superiors” (Giddens, 1984 p16).

The rules and resources in general mediate and constrain human action, while at the same time they are reaffirmed through being used by the human actors. The role of human actors to reaffirm the structural properties is highlighted by the recognition that human agents are purposeful, knowledgeable, reflexive and active.

“All social actors, all human beings are highly ‘learned’ in respect of knowledge which they possess and apply, in the production and reproduction of day-to-day social encounters (Giddens, 1984 p22).”

Social actors as knowledgeable agents account for their reflexivity capacity to routinely observe and understand what they are doing while they are doing it. (Braa and Hedberg, 2002) presented an example on this regard where health workers attributed institutional trust to the existing routine reporting systems and saw them as means to confirm social contracts. The consequence of that was the tendency of the health workers to resist the new ‘improved’ standards.

The continuity of social reproduction is based on the duality of structure and with the reflexive monitoring of social activity by the agents. Regular actions of knowledgeable and reflexive agents establish patterns of interaction that become standardized practices in organizations. However, the purposive actions by the social actors do not imply perfect control of action. There are also unacknowledged conditions and unintended consequences of action (Jones, 1999). Unintended consequences refers to the consequences that would not have taken place if a social actor had acted differently but that are not what the actor had intended to happen (Giddens, 1984). For any planned organizational change, the consequences that escape the intention of the planned change are considered unintended. For instance, the plan of a healthcare organization could be to standardize and integrate the HIS and unintended consequence could be ending up with more fragmentation.

Our study draw on the ST concepts to describe how the main actors as knowledgeable, purposive and reflexive agents draw on the resources and rules available to them to exercise power as they engage in the standardization and integration initiative. As we shall show, this spawns structures of domination leading to unintended consequences rendering the integration goal challenging and unattainable.

Research Settings and Methods

The research was done in Zanzibar, a semi-autonomous region within the United Republic of Tanzania, with two main islands, Unguja and Pemba. Zanzibar is divided into five administrative regions, each with two districts, making a total of ten districts in the entire region. Zanzibar maintains her own health system administrated by a semi-autonomous Ministry of Health and Social Welfare (MoHSW). Alongside the health system is an information system called Health Management Information System (HMIS), meant to provide information support to all decision making processes of the entire ministry. In this paper, the term 'Health Information System (HIS)' is used to refer to the HMIS and the term 'National HIS authorities' is used to refer to the national level MoHSW department, responsible for the HIS.

The research is based on efforts supported by DANIDA to standardize and integrate the HIS in Zanzibar. The implementation of the project is done within the HIS programme called HISP. HISP is a South-South-North collaborative HIS programme comprising of a number of countries from Africa, Asia and Europe. The HISP team in Zanzibar (authors are members of the team) in collaboration with other stakeholders (the MoHSW, vertical programs and donors) started to engage in the standardization and integration of the HIS since 2005. For more information refer to (Nyella, 2007). The study was conducted using longitudinal case study based on interpretive philosophical assumption. Interpretive research aims at producing an understanding of the context of the IS, and the process whereby the IS influences and is influenced by the context (Walsham, 1993). The choice of the interpretive study was catalysed by the need to understand the actors in terms of their resources and the implications these resources in the context of HIS integration.

The research was carried out in four districts in Unguja and one in Pemba within two periods - June to November, 2006 and in April 2009. The empirical materials were gathered through actual engagement in the activities of standardizing and integrating the HIS which included customization of software tool, redesign of data formats, trainings. Other sources included formal and informal interviews, focused group discussions, document analysis such as the Health Sector Reforms Strategic Plans and attendance in meetings and workshops.

In the first fieldwork, 38 informants were interviewed – 19 from Pemba and 19 from Unguja Island. Among the informants included district medical and health officers, health programs managers and central HIS officials. The second field research was a follow up meant to learn changes that had taken place after a period of time. In this round data was collected through interviews and attendance in consultative stakeholder meetings discussing integration of all vertical programs systems in the national HIS. This time 26 informants were interviewed in four districts in Unguja. The fieldwork formed the basis for understanding the national HIS officers' efforts to acquire both material resources and political support to ensure HIS integration.

Case Description - Standardization and Integration of the HIS

In 2002, Zanzibar initiated a health sector reform process, seeking to decentralize planning, prioritization and integration of services to the district level (ZHSRSPii, 2006). Supported by the Danish International Development Agency (DANIDA), the government and other partners; the reform process sought to strengthen among many other things the HIS, to provide information support to decentralized sections of the health system. Hitherto, the HIS was characterised by scarcity of resources, gaps in data collection tools, poor analysis of data, fragmentation towards the vertical reporting systems, poor feedback, lack of motivation and limited information use (Sheikh, 2005). The aim of the HIS restructuring was to review existing systems of data collection to remove overlaps, gaps, integration of similar standards, and ensure that all data is captured in a district data repository accessible to all stakeholders.

The context of the HIS restructuring is described below focusing on the control of resources, followed by the empirical description of the HIS restructuring process highlighting the implication of the resources on the integration initiative.

The Context of the HIS Restructuring - Ownership and Control of Resources

The healthcare Health services in Zanzibar are delivered through directorates of the Ministry of Health and specialized vertical programs such as Reproductive and Child Health (RCH), Zanzibar AIDS control program (ZACP), the Malaria control program (ZMCP) and Tuberculosis (TB) and Leprosy control program (ZPRP, 2002). The main sources of health sector financing are donor funds and fiscal operations of the government. The government financing is derived from general tax revenue sources. However, according to a study by the African Development Bank (ADB), revenues generated by the health sector itself cover less than a half of one percent of annual health sector expenditures and account for insignificant share of total government revenues (MoHSW, 2003). Furthermore, the health sector public expenditure review⁷ for 2006 shows that government contribution accounted for 29% of spending in the sector in financial year 2004/05, while development partners accounted for the balance of 71% (ZHSRSPii, 2006).

DANIDA is one of the main donors within health sector whose resource support base is large and respected (DDAT, 2007). Other partners in terms of healthcare financing include Global Fund for AIDS, Tuberculosis and Malaria, the African Development Bank, and the United States. Most of the donors prefer disbursement of their funds and other resources directly to the specialized vertical health programs to ensure 'proper' management and use of their funds.

Technical health programmes in Zanzibar remain highly verticalised, with some commanding significant external resources. This has resulted in a regrettable situation whereby their planning and reporting activities are in some cases more closely aligned with funders than the MOHSW as a whole (ZHSRSPii, 2006 p26).

However, coordination of these donors/partners and the funds provided is problematic. Though there are many activities in the health sector being funded by donors (vertical health programs being part of them), there is near absence of disclosure by donors on disbursement schedules, time frame of assistance, modalities of procurement, etc (MoHSW, 2003). Allocation of the existing resources in Zanzibar has largely been driven by external, development partner priorities (ibid). As part of the health sector reforms, the government seek to build a framework for coordinating the partner's support, so as to ensure transparency and accountability in addition to directing the resources support to the government priority cost-effective health service delivery interventions.

"The issue of effective management of resources and development partner coordination is critical because implementation success of the reforms will depend to a large extent on development partners' support. It is therefore paramount that concerted efforts be made as part of the reform process on how to coordinate the inflow of development partner support so as to ensure transparency and accountability in addition to directing the resources support to priority cost-effective health service delivery interventions and activities" (ZHSRSPii, 2006 p19).

However as presented in the ZHSRSPii (2006), the issue of integration which would enable pooling and well coordinated allocation of the resources is a potentially thorny one, with vested interests working against reform efforts. Nonetheless, as further stressed out in the (ibid), the efficiency gains and potential equity gains of rationalisation in certain areas are difficult to ignore, and the coming period will see renewed efforts by the central MOHSW to integrate and coordinate central support activities.

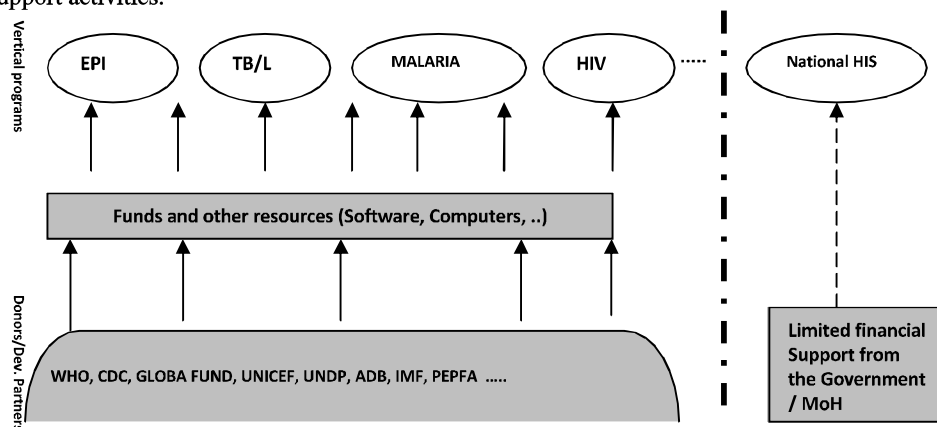


Figure 1: Flow of funds and other resources (Source: Fieldwork)

As shown in Figure1, almost all the donors' funds go directly to the vertical health programs to support program healthcare activities including the program based HIS. The national HIS however, depends on the very limited government funds disbursed through the Ministry of Health. The impact of the resources available to vertical programs for establishment and maintenance of their HIS is vivid for those with strong donor support. Such programs are characterised by strong management structure which is well resourced in terms of human and material resources (computers and software etc). Examples of such programs include Malaria, HIV/AIDS, EPI and TB & Leprosy.

The subsequent section presents the HIS standardization and integration initiative, covering some of the programs which were involved and the way they responded to the new system. We show how programs managers drew on their resources and respond differently to the new system and how the national authorities used resources available to them to counterbalance the move.

The HIS Restructuring Process

Drawing on incremental and participatory approaches, the HIS restructuring process started by revision of existing datasets and definition of new ones. Based on the approach, the following datasets were included in the integration initiative: Expanded Programme on Immunization (EPI), Disease surveillance, Reproductive and child health (RCH), Sexually Transmission Infections (STI) & Human Immunogenicity Virus (HIV) dataset, and Maternity dataset. EPI had mainly two main datasets, one for monitoring provision of vaccination services and another one for disease surveillance. The vaccination dataset saw some minor changes during the revision process, leaving it more or less as it was but with a

mandate that its data should be captured in a common electronic database at the district level. In terms of control and support of this dataset by the EPI program, it was more or less vertical but with one important change – the data is captured in the common database giving access to all other stakeholders. However, the disease surveillance EPI dataset, being similar to the national Disease Surveillance dataset, were both standardized and integrated to form one dataset. Unlike the vaccination dataset, the mandate to integrate the surveillance datasets made EPI translate it as loosing control to their dataset. Though the integrated dataset was running for a period of time (eight months) the EPI program kept on collecting data using their own dataset. As asserted by one official:

“.. Until we are sure of getting our data, we can not abandon our system” (Manager, July, 2006)

Malaria program is another health program with keen interest with the disease surveillance dataset. With a very strong donor support working towards reversing the malaria trends in the country, the program had a great need to monitor the various malaria interventions on the ground. The disease surveillance being the main source of the malaria data, the program was involved in the design and implementation stages. For instance, the program’s data manager was involved in conducting training for the new disease surveillance dataset (that included the malaria data). However, despite of the involvement the data manager designed a separate data collection tool behind the scene and rolled it out in some districts. When enquired of it, he stated:

“They have taken out almost all the age group categories and left what they feel will satisfy their needs, but what about us?. So we designed it to show them how it should look like” (Manager, August 2006).

However, when the national HIS officers learned of the practice, a decree was issued requiring the program to adhere on the agreed national data tool for disease surveillance. During the follow up field research (April 2009), the program was using the national surveillance tool.

The Zanzibar Aids Control Program (ZACP) is another health program which despite of being involved in the process of designing new dataset for the program’s services (HIV & STI), kept on using their previous dataset tools separately. ZACP is one of the strong programs funded by different donors such as the Global fund, Centre for Disease Control (CDC), United Nations Development Programme (UNDP) and the World Health Organization (WHO). The program maintained its own fragmented HIS, one for VCT and another one for STI services. These subsystems were integrated into one dataset forming an ‘STI and HIV/AIDs’ dataset. The dataset was functional for more than six months with data routinely collected and collated from almost all health facilities providing the two services. Although most of the data was submitted to the districts and transmitted to higher levels, the data was not fetched and used by the ZACP. Instead, the program kept on depending entirely on their previous systems. The reason given was that the new dataset did not fulfil data requirements for program management and that it was not designed for the ZACP but for the national HIS.

“The new tools are for the higher levels only; they can not help us in any way. We need more information compared to what is on the national HIS form. It is not designed for us” (Manager, July 2006)

Though the program officers participated in the design process of the dataset, the participation as explained by one officer was meant to help the national HIS authorities get HIV/AIDS related data. As explicated by one national HIS officer, lack of trust by the vertical program of the capacity of national authorities to sustain the HIS was envisioned as one of the reasons:

“..... we rely on donors in almost everything which sometimes lead to mistrust by the vertical programs of our capability to maintain and sustain the HI. For instance EPI are performing well because they have enough funds (from donors)”. (HIS officer, July 2006)

This is further reinforced through a follow-up field visit (in April, 2009) by one of the authors

The national HIS initiative has been funded by DANIDA for more than 90%. They (DANIDA) are not funding the HIS initiative alone but almost everything relating to health sector reforms in Zanzibar (HIS officer, 2009).

The follow-up visit revealed some efforts done by the national HIS to ensure all the vertical programs become part of the integration initiative. One of such efforts is consultative meetings by the national HIS which meant to enrol fully all the programs such as the Zanzibar AIDS Control Programme (ZACP), TB/Leprosy, Home Based Care (HBC) and the Preventive Mother to Child Transmission Programme (PMTCT) into the initiative. The national HIS management has a top level political support for integration of these vertical systems into the national HIS. This is based on the order issued by the national health principal secretary to all health programs requiring their HIS be integrated on the national data warehouse. The programs attended in a two days workshop which saw revision and harmonization of different data formats whose implementation is continuing up until the time of writing.

We are done with the data review with all vertical programs with exception of TB-HIV data. We will soon be done with it once we get time (HIS officer, 2009).

As stated earlier the national HIS integration initiative depends almost entirely on DANIDA support, however according to one official, the support has been halved since 2009. She further observed that if they will completely withdrew their support many things will crumble.

So you can see that, if they will withdraw their support we will not be able to move alone and so many things will crumble (HIS officer, 2009).

However, the national HIS has different strategies so far in place to acquire support from different donors as asserted below:

We have a new donor (Italian cooperation) who has signed a two years support for HIS especially on capacity building and training (HIS officer, 2009).

Furthermore the national HIS expect to mobilize and receive support from the vertical programs to sustain the integrated HIS:

The fact that all programs will be integrated within national HIS, and the fact that each program has a component for HIS, then, we will be receiving some support from vertical programs that will facilitate activities relating to the national HIS (HIS officer, 2009).

Whether the programs will remain 'faithful' to the new system after the implementation process; remains to be seen.

Analysis and Discussion

In this section we draw on concepts from Structuration theory to analyze the empirical materials. We start by the analysis the two main actors in the light of the resources available to them. The impact of the resources as they are drawn upon by the actors mediating their responses to the HIS integration is subsequently explored. This section ends by discussion of the strategies to counter the effect resulting from the ownership and control resources implicated in HIS integration.

Analysis of the Resources Controlled by the Main Actors

Zanzibar, the context of our study is a low income country, highly dependent on donors for social and economic development. The big share of the health sector budget is contributed by donors (ZHSRSPii, 2006). However as seen from our case, most of these resources are controlled by the donors (one of the main HIS actors) in terms of allocation and use (ibid). These resources generate power which underpins actors' ability to effect changes in their operating social environment – health sector. For instance with a condition of 'proper management' most of the allocative resources (Giddens, 1984) are directed to vertically organized health programs (Figure 1). Though this can also account for the actors knowledgeable, reflexive and purposive characteristics, in terms of their decisions for proper management, this however does not imply perfect control of their actions. For, there are also unacknowledged conditions and unintended consequences of actions (Jones, 1999). For instance, as an unintended outcome of the vertically organized allocation of resources, is the deprivation of other health care services in terms of resources, which sometimes may paradoxically be the one to be given the first priority.

Malaria health program, as described in (ZHSRSPii, 2006), utilized huge amounts of allocative resources compared to other health programs and services which are of relatively equal or more significance. The resources directed to these programs have significant effect on their HIS and on the initiative to integrate them in the mainstream HIS. More often, these vertical HIS consists of well organized management structure with both human and other allocative resources. These management structures are sometimes in conflict with the national HIS. This is exemplified by the TB & Leprosy program which maintains a totally different administrative structure upon which their HIS is built. As the result, this was taken as the reason for the TB/leprosy HIS to run separate from the mainstream HIS.

The MoHSW authorities characterized by the meager allocative resources, is embarking on a process of coordinating the donor support to ensure proper allocation of the resources by targeting on the most priority areas in the healthcare system. Though the MoHSW authorities may be considered resourceful in terms of its authoritative power accounted for by its political mandate to coordinate the donors support, this is weakened by its meager allocative resources. As pointed out in (ibid), coordinating donors support is a potentially thorny issue, with vested interests working against the health sector reforms efforts. However, the MoHSW authorities as knowledgeable, purposeful and resourceful (political mandate) actor reaffirmed its position by arguing that the efficiency gains and potential equity gains of rationalization in certain areas are difficult to ignore, and the coming period will see renewed efforts by the central MOHSW to integrate and coordinate central support activities.

The asymmetric ownership and control of resources depicted above shows how actors draw on resources to exercise power over other actors which ultimately constitute to organizational structures of domination. These structures of domination enacted in such a context of healthcare reforms initiatives which includes the HIS standardization and integration renders the reform goals challenging and difficult to attain. We use the term asymmetric to emphasize a situation where one group of actors have more and different type of resources compared to another. The challenging part of such a context is the fact that each main actor has resources and knowledgeable enough to wield power over the other actor leading to the dialectic of control (Giddens, 1984). It is argued that there is always some resources available to humans with which to act in ways that counteract the effect of a social pressure (ibid). This further explains the failure of the effort by different countries to pool resources from the categorical health programs to the integrated HIS (Brown, 2001). In the subsequent section we look at the effect of the resources on the HIS integration initiative.

Implication of the Resources on HIS Restructuring – Resources Mediated Power Tensions

The standardization and integration initiative took place in such a context characterized by the asymmetric ownership and control of resources and rule system. The national HIS could be envisioned to have much of the authoritative resources depicted by their political will and mandate to standardize and integrate the HIS. On the other hands, the vertical programs seem to have more of the allocative resources (e.g.: funds, human resources, software and paper tools) available to them. Actors draw on these resources to exercise power and get things done (Giddens, 1984). The decision taken by one of the program officers to design a separate data collection tool behind the scene clearly depicts the transformative capacity of actors as they draw on the resources available to them. A lot of factors mediated such a decision and action, including funds and human resources to design and circulate them, stock of knowledge of how to design and implement the tool. The action of the program officer underscores the reflexive, purposeful and active trait of human actors; highlighting their frequent monitoring of their own actions and that of others.

Similar action is represented by the decision of some program managers to run their old data tools alongside the standardized tool. This was attributed, partly by the allocative resources (funds to maintain their tools, excel based software tool etc) available to them and the knowledge of the vertical program managers of the economic status of the national HIS. The answer provided by the manager, of the need to be sure of continually getting their data from the national HIS, clearly depicts the reflexive and knowledgeable character of human agents. The HIV/AIDS program (with a number of donors behind it), is another program whose managers drew on their resources to mediate their response towards the national HIS standardization initiative. Though the managers were involved in designing and implementing a dataset tool for HIV, the program opted to rely on their previous systems. The response provided by the manager depicted their capacity to maintain their own systems, with an argument that the new dataset was meant for the national HIS data needs.

The varied responses to the HIS standardization process by the vertical program managers, mediated by the resources available to them spawned structures of domination. However, according to Giddens, there is always a possibility for the other actors, to whom power has been wielded to act to change a particular structure of domination. To counteract or offset the power relations, the national HIS drew on the authoritative resources available to them. Using its authoritative power the national HIS officials resorted on participatory approaches such meetings and workshops to summon their rivals to resolve some of the problems related to their lack of allocative resources. This was evident by the mechanism used to solve lack of data collection tools problems. The national HIS immediately called a meeting summoning all the vertical programs including donors to deliberate and resolve the problem. Therefore, the national HIS tried to change the structure of domination by drawing on the authoritative resources available to them leading to the *dialectic of control*.

The dialectic of control can further be explained by the renewed effort by the national HIS authorities to have all the programs integrated in the national HIS despite of its meagre allocative resources by striving hard to get support from donors to achieve her main goal. The decree issued by the national health principal secretary to all health programs requiring their HIS integrated on the national HIS further depicts the political pressure towards integration. The dialectic tensions resulting from the asymmetric ownership and control of resources render the integration goal challenging and sometimes unreachable. Neither the national HIS nor the vertical programs seem to have control of the whole process. For instance, when the vertical program managers are summoned to discuss integration issues they comply to the authority of the national HIS but when it comes to implementation which depends largely on allocative resources the national HIS authorities is found wanting. Instead, the control is automatically taken by the vertical programs as they draw on their resources to implement their own agenda.

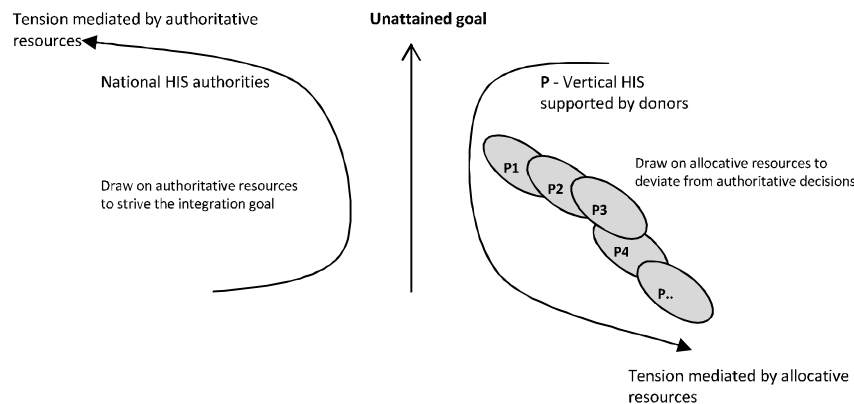


Figure 2: Power tensions leading to unintended consequences

The ultimate result is the divergence from the main goal resulting to unintended consequences of even more fragmentation and duplication of efforts, data and tools standards. Running the old data and tools standards of the vertical programs alongside the new integrated system is a manifestation of more challenges and frustrations to practitioners at the local level as they are now confronted by both the new and the old standards all at once. Fig. 2, indicates the tension between the two main actors as one attempt for standardization and integration by drawing on the authoritative resources and the other actor backed by allocative resources strive to maintain the vertical HIS. The ultimate result is unintended consequences of unattained goal and more fragmented HIS.

Unlike most of the studies on the issue of power in IS discourse treating power as stable, zero-sum and somehow negative (Kling and Iacono, 1984; Markus, 1983), our study conquers with Rolland and Aanestad (2003) who through the study of information infrastructures development showed that power is performed, dialectic, distributed, implicit and inscribed. We have shown how power is performed based on the capacity of the actors as knowledgeable and reflexive subjects to make a difference as they draw on the resources available to them. Furthermore, we have shown that other than power being wielded from a single actor, it is rather distributed and dialectical where every actor has some resources (authoritative or allocative). Inline with the concept of power as distributed we propose an approach towards HIS integration of the vertical HIS based on flexibility and distributed control. Further, we argue for the HIS standardization and integration venture be re-conceptualized as a process of creating new structures of meaning between the main actors mediated by communication processes.

Proposed Approach – The Need for Distributed Control of the Integrated HIS

The complex contextual realities of the health sector in low income countries as in our case provoke a lot of challenges in any efforts to change existing systems. These challenges results from the poor state of local authorities and the multiplicity of actors, rendering the context *a battle ground* where different competing and overlapping interests by the various actors are at play. This is epitomized by the tensions between the two main actors in the HIS integration resulting from the asymmetric ownership and control of resources. Paradoxically, neither side is in control in any strict sense, calling for a pragmatic approach in ensuring a workable solution.

Our first proposal is the need to build meaning of the HIS standardization and integration process between the actors. From the outset of the project, actors have myriad of interests and agendas. We argue for the need to re-conceptualize the harmonization of these interests as a process of reshaping and creating structures of meaning. To achieve this, the interaction between the two actors through communication processes is of paramount importance. Communication mediated by the stock of knowledge of what can be considered as possible solution for the problem is necessary to achieve an integrated HIS, agreeable and shareable to the parties involved. As shown from our case, lack of proper communication between the actors lead to creation of structures of meaning which were in conflict with the main goal of integration. The argument by one of the HIV/AIDS officers that ‘his participation was meant to help the national HIS authorities get their data’ or ‘the new tools are for the higher levels only’ indicate a partial understanding of the whole aim of the integration process. A clear meaning of the dynamics and the outcome of the integration process should be built up through communication processes such as meetings and workshops involving the main actors.

Coupled with the need to build meaning is the need to agree on how the integrated system should be constructed by taking the contextual particularities as a point of departure. As seen from our case study top level managerial control in a context of asymmetric ownership of resources confer little hope for integration. Alternatively we argue for a distributed control of the integrated HIS built on a modularised and flexible approach. By distributed control we mean a HIS system organized in such away that specific strong programs HIS are built as separate modules in the integrated HIS. For instance, HIV/AIDS, EPI and TB & Leprosy can be implemented as separate modules. This approach gives the program control and ownership of their module without compromising accessibility of the data by other actors. This is because all the system modules will be integrated in one HIS.

An example from our case which worked well based on the approach is the Immunization dataset which is under the EPI program. The dataset was revised with strong collaboration with the EPI program managers. The managers were given leading role in the process of redesigning, testing and implementing the dataset in the health districts. Drawing on their resources they conducted trainings for the new data and tool standards for EPI and provision of supportive supervisions to districts and health facilities health officers. Furthermore, the program ensures that the data is captured in the integrated district data warehouse accessible to other actors including the national HIS authorities. In contrast to the HIV dataset where from the onset of redesigning the tool, control was under the national HIS authorities. The ownership and control of the dataset was in a sense pre-empted from the HIV management. Their involvement during the redesign phase was not clear as what was anticipated of them in terms of running and control of the new dataset. As the result, the dataset received limited support from the HIV program managers as they continued to use their previous datasets. The argument is that since the strong programs are quasi-independent operationally, the distributed control conforms to their operational nature by providing a partial control to the integrated HIS based on a modular structure.

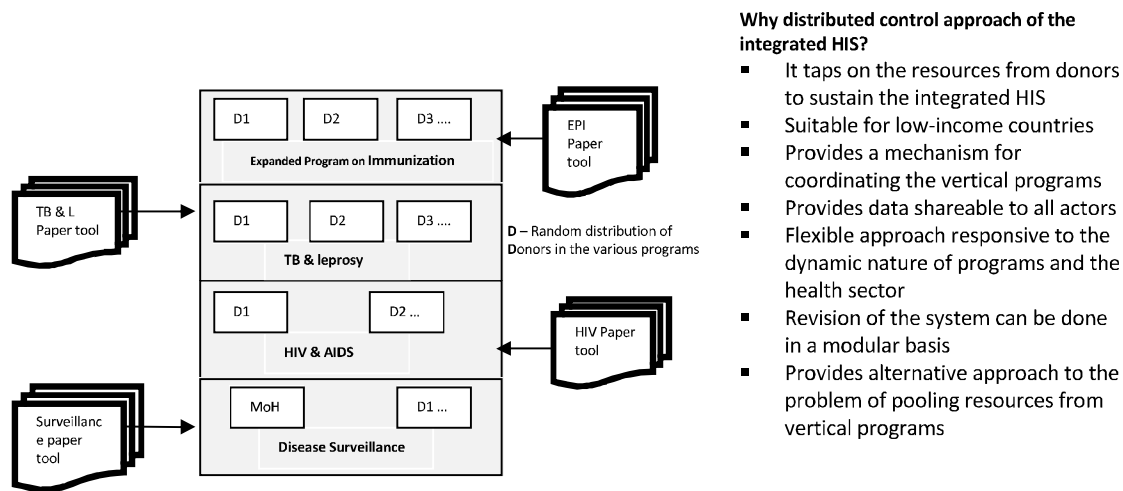


Figure 3: Modularized integration approach based on the strong programs

The distributed approach provides coordinating role to the national authorities and control of other modules which are not under the strong vertical programs. By drawing on HIS guidelines built based on the distributed control approach and agreed by the two main actors, the national authorities can accrue lots of benefits by *tapping* on the resources controlled by the vertical HIS to sustain the integrated HIS. The approach provides alternative solution to the problem of pooling resources from the categorical health programs to the integrated HIS (Brown, 2001).

Conclusions

Though HIS integration in developing countries has been recognized as the basis for coordination and linkage across health programs, achieving that goal is quite a challenge. The complex contextual realities of the health sector in these countries as in our case provoke lots of challenges in the efforts to change existing systems. These challenges as the paper showed, results partly from the poor state of local authorities and the multiplicity of actors, rendering the HIS context a *battle ground* where different competing and overlapping interests by the various actors are at play. In our case, this is epitomized by the tensions between the national authorities pushing for HIS integration and vertical programs supported by donors resulting from the asymmetric ownership and control of resources.

Using the Structuration theory concepts we have shown how actors drew on resources to exercise power over each other, which ultimately constituted to organizational structures of domination. The fact that each main actor has resources and knowledgeable enough to wield power over the other actor leading to dialectic of control (Giddens, 1984); paradoxically means neither side is in control in any strict sense. The paper proposed the need to strongly build meaning of the HIS integration using communication processes and the use of modularized distributed control approach of the integrated HIS facilitating the '*tapping on*' of the resources available to the various actors. The approach is more pragmatic in low income countries with strong quasi-independent vertical programs supported by myriads of donors. However, further research on the proposed approaches is needed to unravel the practical dynamics involved.

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