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On Being Specific about Power: Institutional Dualism in Information Systems Integration

Yahya Hamad Sheikh[1]
University of Oslo, The State University of Zanzibar

Abstract. Why is information systems integration in the public healthcare sector complicated? This paper unpacks the causes of such intricacy using the concept of institutional dualism. The empirical materials are derived from the Zanzibar healthcare sector, where data were collected using qualitative methods such as interviews, focus group discussions, document analysis, and participant observation. Cases from selected health programmes are examined in essence in order to shed light to which we can understand the HIS integration process as a straddling task of institutional matching or mixing where multiple institutions meet. Findings suggest that the resulting trajectories are the results of power interplay between actors involved, where power highly shapes reality and consequently affecting the prospects of the HIS integration.

Keywords: Health information systems, integration, institutional dualism, institutional logics, power, developing countries.

[1] The University of Oslo ; Boks 1072 Blindern; NO-0316 OSLO; Norway
State University of Zanzibar; Vuga Rd, Zanzibar Town; Tanzania
Email: yahyasheykh@gmail.com

1. INTRODUCTION

Organizations are highly investing in using the opportunities offered by the potential of information and communication technologies (ICT) in order to improve their performance, productivity and competitive advantages (Qureshi, 2009). In the public sector, the main aim is to improve government efficiency and responsiveness to its citizens (Heeks and Santos, 2009). This adoption of ICTs is expected to advance the developing countries' chances to compete in a more equal basis in development (UN, 2000). In recent years, the trend has been to use ICTs to monitor countries' performance in response to the millennium development goals (MDGs) that cover various public sector of service provision (UN, 2008). This study focuses on the domain of healthcare sector in the context of developing countries. The healthcare sector is one of the ill-performing sectors despite its importance to the public, drawing special attention from the international community, where the United Nations has identified three health related development goals out of eight that countries need to reach their targets by 2015 (UN, 2008).

To tackle the problem of poor healthcare services in the developing world, donor agencies, both bilateral and multilateral, have been providing tremendous financial and technical assistance, usually organised in the form of vertically organised health programmes within the healthcare bureaucracy of the beneficial countries. These programmes focus on providing specialized services such as immunization and mother and child care or on fighting particular diseases such as malaria, HIV/AIDS and TB (Chilundo and Aanestad, 2005). Consequently, each programme deploys its own information systems (IS) to support monitoring and evaluation of the services provided and manages the resources being used, with reporting requirements to the financiers in order to ensure accountability. As a result, the healthcare sector of individual countries experiences multiple and uncoordinated IS serving the sector, where the data collected by each programme often overlap, sharing the data collection staff whilst the data collected is never shared (Sheikh and Titlestad, 2008).

In order to address this challenge, the Health Metrics Network (HMN) underlines information systems integration and the use of ICTs as an important step towards strengthening health information systems (HIS) of a particular country. Integration will help to reduce data collection burden to health workers, improve data quality and reduce data administration costs, and consequently will help in proper healthcare sector planning, monitoring, and evaluation (HMN, 2008).

This paper addresses the problem of integrating HIS in such context. Empirically, the research is based on the project to integrate HIS for Zanzibar healthcare sector. The analysis is based on the broader perspective of IS integration -that of organizational routines and institutions on top of the technical aspects of integration (Alexander, 2004; Sahay et al., 2009). The HIS integration project case is built from case units from selected health programmes (HIV/AIDS, reproductive and child health, malaria, immunization and nutrition) that operate in the Zanzibar healthcare sector. These are

examined to identify challenges associated with the process of integrating the individual programme information systems, both during the integration of the artefact as well as post-artefact integration.

We base our discussion on the concept of institutional dualism, referring to a situation where two different institutional contexts or institutional systems come together as a result of innovations in public sector (Brinkerhoff and Goldsmith, 2005; Heeks and Santos, 2009). We examine the two institutional contexts: the historically established multiple HIS that serve the different programme, and the new integrated HIS. The two institutional contexts are built from different logics. In one hand, programme based HIS are aimed to help the specific programmes on monitoring and evaluation of the individual services they provide on top of reporting to their respective donors to secure trust. On the other hand, the integrated HIS is aimed at providing quality data to all stakeholders (including the programmes), promoting data sharing and the use of ICTs to facilitate easy data access and presentation of information.

We view the emerging trajectories in the HIS integration as the impact of manipulating financial, material as well as the administrative resources, thus analysing the results through the lens of power (Lukes, 1974; Bachrach and Baratz, 1962; Clegg, 1975; Pettigrew, 1979; Foucault, 1979). The paper discusses the emergent trajectory on the integration process and how the outcomes are influenced by the stakeholders involved. Thus, the objective of the paper is to unpack the tensions that arise on course the HIS integration project in Zanzibar and how they affect the integration process. This is addressed through the following research question:

How does power tensions around the actors involved in HIS affect the integration process?

Next section presents a conceptual framework that will be used to analyse the institutional dualism in HIS integration project in Zanzibar. The discussion starts with presenting the status quo of HIS in developing countries and the need for integration followed by highlighting the complexity involved and how institutional dualism concept can be used to unpack that complexity. We supplement our conceptual framework with the notion of power and how it plays roles in this duality.

INSTITUTIONAL DUALISM IN INFORMATION SYSTEMS INTEGRATION

Information Systems integration has been a topic of discussion amongst researchers in the various fields of IS. For some time, a dominant group conception has been on viewing IS integration from pure technical angle. To these researchers and practitioners alike, the main concern has been on how we can offer technical solutions to integrate systems of different background in order to cater for the evolving business and technological needs, while reasonably retaining legacy systems and legacy technologies. A major issue has been keeping the right balance between distribution,

autonomy, and heterogeneity (Hasselbring, 2000). Thus, researchers focus on how to develop right standards, techniques, and approaches for attaining integration.

This conception is however criticised by the other school which believe the social and organisational aspects play equal role on IS development. This group conceptualise IS development as rather socio-technical process, highlighting the needs on working around the organisational and social issues during development and post development of technical solutions. In this paper we contribute to the later conception, and particularly within healthcare sector in developing countries. Our analysis of IS integration, is motivated by the observed alarming level of healthcare information systems failure, one reason being a design-reality gap (Heeks et al., 1999; Heeks 2003), which spells out the inattentiveness to the social and organisation realities.

The socio-technical conception of IS design and development originates from early works by Robert P. Bostrom and J. Stephen Heinen who explicitly identified cause of IS failure being the design strategies that explicitly view information technology (IT) as just artefacts, disregarding the dynamics of the changing organisational and social environment in which information systems are built. The authors draw from socio-technical systems theory, and they conceptualised IS systems as socio-technical systems with IT artefacts and organisation procedures and routines highly intertwined (Bostrom and Heinen, 1977; Bostrom and Heinen, 1977).

In the healthcare sector, the concept was pioneered by Berg et al. (1998) and Berg (1999) in their studies of electronic patient record, and patient care information systems, respectively. In these studies, and subsequent studies, the agenda has been to unpack the socio-technical configurations in which the design process is politically textured towards organizational changes, involving the way people work and behave as influenced by organisation policies, procedures, and norms, all of which are also subject to interference following the introduction of the new information systems. Despite considerable number of research on this strand in healthcare sector, little has been done on IS integration, and in particular in within healthcare sector in developing countries.

We thus, contribute to analysing healthcare information systems integration from this perspective. Drawing on the nature of healthcare sector, and particularly in developing countries, we offer an ideal stage to discuss issues associated with IS integration from the socio-technical perspective. Healthcare sector possesses special character: the nature of the systems to be supported, stakeholders involved and sensitiveness of data and work practices. In developing countries, another level of complexity prevails. Due to resource scarcity experienced by almost all developing countries, fragmented information systems evolved on necessity. Multiple donor agencies operating in these countries have formed strong specialised programme in order to assist in offering the badly required services.

In no doubt, the only way to monitor progress and resources they offer is through setting up information systems to cater for the data needs of particular programmes. In doing so the sponsors can guarantee themselves of accountability and impact of the assistance they offer (Chilundo and Aanestad, 2005). As a result, this has led into

serious challenges. Redundant data collection overburdens the health facility staff resulting into problem in both quality of care, and quality of data, redundant data collection leads to data inconsistency especially for the shared data, and lack of complete picture for the overall healthcare monitoring. It is indeed these problems associated with fragmented HIS which led to the continuous call on integration. In its latest publication, Health Metrics Network advocates for integrated HIS as the key to health information systems strengthening (HMN, 2008), repeating the call indicated by various studies, with the aim to providing comprehensive, quality and timely data for healthcare planning, monitoring and evaluation.

Having presented the history and the cause of fragmentation, the justification for the need of integration, and in consideration of the complex array of actors in the healthcare sector, we find it very helpful to discuss HIS integration from this perspective. In order to better understand this complexity, we draw on the concept of institutional dualism. Institutional dualism refers to a situation where two different institutional contexts or institutional systems come together as a result of innovations in public sector (Heeks and Santos, 2009). It refers to the resulting tension between the intended new institutions and the old [often] unwanted institutions (Brinkerhoff and Goldsmith, 2005). By institutions we refer to those routines comprising regulative processes, normative systems and cultural frameworks that shape information systems development and use (Scott, 2008; Orlikowski and Barley, 2001).

The concept of institutional dualism was initially used Brinkerhoff and Goldsmith (2005) to discuss challenges associated with innovation in international development projects. In that article, they examine trade-offs and complementarities between what the rational agents like the World Bank which explicitly attempt to identify what is good and what is bad practice when it comes to governance. The argument, they try to build is that an explicit differentiation between the two and drawing a line to which organisations shall follow are not necessarily leading to success of any development or innovation effort. They analogise good practices to formal guidelines which the agents impose for the organisations to follow, and bad practices with informal institutions, that is, what people do informally, often mixed with rules and regulations that govern particular organisation or society. According to them however, the real power of doing things rely on the informal arrangements and networks, and how this is embodied into the formal structures (ibid). It is this power which needs to be cultivated in for successful and sustainable integration of HIS.

Extending this debate on institutional dualism in information systems development and particularly within e-government initiatives, Heeks and Santos (2009) outline a broader challenge of institutional context on implementing Information System on Public Health Budgets (SIOPS) in Brazil. In this study, they underscore the institutional dualism resulting from mismatches between what the designers perceived as rational decision to introduce the system with its power enshrined in the constitutional reforms, referred as Principal-Designers Institutional System. This is against what they considered the system potential adopters infused with rules, norms, and values of historical traditions such as politicisation, unaccountability and centralization, referred as the Agent-Adopters Institutional System. They consider the later as informal against

the formal institutions of the former. The result, as they present, is an unpredictable trajectory with various means to find solution on table. As it was the case of international development by Brinkerhoff and Goldsmith (2005), they also posit their discussion around the formal-informal dichotomy trying to draw a boundary between the two and see how this boundary can be infused as a means towards an institutionalised IS innovations. This formal-informal dichotomy is also emphasised by Sautet (2005) who provided a simple model of the relationship between the domains of formal and informal institutions portraying an overlap between the two to be ideal for the successful organizational changes and innovations, "the greater the overlap between formal and informal institutions, organizational change will be enabled more easily" (Piotti et al., 2006) p.94 pointing up to the role of existing informal constraints to successful and sustainable IS development.

The healthcare sector in developing countries overwhelmingly suffers from the multitude of stakeholders' interests inscribed in both technology and routines, often hampering any innovation initiatives towards integrated HIS. Thus, analysing the situation from the formal-informal dichotomy might not provide broader picture of the context, and hence, we would argue for analysing the context from the third angle where we view the existing system as a proper overlay of formal-informal and how the new formal will come to find its place in the existing normalcy. The history portrays the reasons of the existence of these multiple, parallel and fragmented information systems and outlines how institutionalised those systems are, and thus the inclusion of the third level of analysis will help in unpacking the complexity underlying the integration. The actual boundary between the formal procedures and informal activities associated with these systems are difficult to draw indicating how institutionalised they are.

These systems have been used by those programmes for a long time and are part and parcel of daily life, enjoying the strength of the broader institutional context encompassing resources, politics, and power. Most healthcare staff take the systems for granted; health facility workers collect data, district managers collate the data and send to higher levels, none of them, or staff at the national level questions the usefulness of the data they collect, even for their respective level of administration. These systems entail established ranks, and ways of life, and thus enjoy legitimacy to both the designers and operators. For example, in Mozambique, Mosse and Sahay (2003) report the healthcare staff actions of manual data reporting to higher levels as showing sense of responsibility because the bosses see them doing the work. In this case rationality on whether this is really needed, or at least this way is not an agenda.

To discuss the proposed framework, we use some concepts from the theory of power, and in particular we use it to analyse the integration project from three angles. First, how actors who control key resources affect the integration process, drawing from Lukes (1974). Second, how the new setup affect the decision-making (Bachrach and Baratz, 1962) concerning the implementation, and third, how administrative authority affects the same (Foucault, 1979).

2. RESEARCH SETTINGS AND METHODOLOGY

The study is based on the HIS integration project in Zanzibar, a country archipelago that is part of the United Republic of Tanzania. The nature of the united republic, gives autonomy to Zanzibar on several affairs including healthcare service provision where the Zanzibar Government is the sole authority. Zanzibar comprises two major Islands (Unguja and Pemba) along with several islets covering a total of 2,600 sq km with a population of 1,303,569 .

Administratively, Zanzibar is divided into five regions and ten districts. Each region comprises two districts. Three regions are located in Unguja, which is bigger island and two in Pemba. Healthcare administration follows the same administrative structure at the district level, where District Health Management Team (DHMT) is responsible for all healthcare administration issues over the health facilities located in a particular district, from medical supplies to data collection. DHMTs report to Zonal Offices, where a Zonal Health Management Team (ZHMT) is responsible. Each Island, Unguja and Pemba form a zone and they both report to the National level.

Healthcare service provision is organised into three levels: primary level mainly concentrating on preventive services and basic curative services, secondary level that comprises the district hospitals, and tertiary level comprising Mnazi Mmoja Hospital, which is the main referral hospital in Zanzibar. Different programmes operating at all three levels are engaged in the provision of specialised services such as maternal and child health and some are responsible for particular diseases such as malaria, HIV/AIDS, TB and Leprosy, and have support from different donor agencies.

2.1 RESEARCH DESIGN AND METHODS

Epistemologically, the study is drawn from interpretative strand (Walsham, 1993; Walsham, 2006), in order to understand the HIS integration challenges from the experience of those who are directly involved (Cavaye, 1996). Interpretive research in information systems development is very useful in helping researchers understand the problem in the contextual nature (Klein and Myers, 1999).

To unpack the complexity around the HIS integration project in Zanzibar, we adopted a case study, where four case units were studied and a comparison in relation to their involvement in the HIS integration is made. Case study is powerful approach in studying complex phenomena like the one presented in this study (Cavaye, 1996; Baxter and Jack, 2008) because it enables capturing the 'reality' of the work in its natural context.

Data were collected using qualitative methods. This includes interviews, focus group discussions, document analysis, and participant observation counting to my role in the project implementation for the period covered in the study. My own experience of the project also contributes to the data.

A total of 21 interviews were conducted to district and programme staff. Document analysed include quarterly health reports, annual reports and data collection forms from

the mainstream HIS and programme HIS. Focus group discussion was between the district, HMIS unit and programme staff who met in several HIS activities such as data collection form reviews, data use workshops, health information bulletin preparation workshop. The author has worked as a participant observer working in the daily assignments including software configuration, training and support and participation on the various workshops and meetings. Field notes were taken in a diary and were later typed into a computer.

Data interpretation has been driven by interpretive process. In particular, a principle of hermeneutics as outlined by Klein and Myers (1999) were followed. Throughout data collection process, initial analysis was conducted to identify areas which needed more clarification and to see if there were interesting themes rising (Pope et al., 2002). The process of identifying themes and relating them to the theoretical concepts of institutional dualism and power governed the whole analysis process.

3. RESULTS.

3.1 ZANZIBAR HEALTHCARE LANDSCAPE AND HIS INTEGRATION ARENA

To present the HIS integration case in Zanzibar, we present four case units, each presenting one programme highlighting the programmes' roles and their involvement in the HIS integration process. The selected programmes are: Reproductive and Child Health (RCH), Zanzibar AIDS Control Programme (ZACP), Zanzibar Malaria Control Programme (ZMCP) and Expanded Programme for Immunization (EPI) and Nutrition Programme discussed in one case. Before the case presentation, a historical background of HIS is presented. Along with this, the Health Management Information Systems (HMIS) Unit is also discussed -its roles, capacity and the outcome of the process. Finally, the empirical analysis of the case is analysed with a focus on power tensions featuring the institutional dualism.

An overview of HIS development in Zanzibar

A joint survey conducted in 2004 by the World Health Organization (WHO), Danish International Development Agency (DANIDA), University of Oslo (UiO) and the Ministry of Health (MoH) revealed a highly fragmented information system largely programme-based, in the Zanzibar healthcare sector. This triggered major reforms aiming at developing integrated health information system. Health Information Systems Programme (HISP) was contracted to undertake the assignment, which was funded by DANIDA. The project scope included developing new shared data collection tools integrating the previous tools used by different programmes HIS, and installing a computer based system to facilitate effective and efficient data storage, processing and presentation. HISP introduced its globally researched and implemented software data warehouse solution called District Health Information Software (DHIS).

The development process was inclusive, where programme data managers, the HMIS Unit officials and officials from the district and zonal health management teams,

hospital data managers, and doctors were involved. The design rationality was based on the concept of minimum data and indicator sets that are useful for healthcare management. Thus, rather than designing data collection tools that are programme-specific, the tools were designed in service categories (e.g. reproductive health, child health, etc.) and it was agreed that programmes should share the data collected through one integrated system that is supported by a data warehouse. The HMIS Unit was assigned the responsibility to oversee the new HIS. HISP as the consulting agency was responsible for technical facilitation for designing the data collection tools and configuration of the data warehouse, trainings and other technical support to the HMIS unit.

The following subsections empirically describe the roles of the major actors in the in the integration process, their involvement and how power issues, largely based on resource ownership and authority contribute to the duality of institutions.

3.2 REPRODUCTIVE AND CHILD HEALTH (RCH) PROGRAMME

RCH programme is involved in broad service provision from antenatal care, delivery and postnatal care for mothers to child health monitoring, with data and service provision interests spanning to other programmes including ZACP, ZMCP, and Nutrition. For example, the new integrated HIS has a form called 'RCH monthly report' whose data are supposed to be shared with ZACP and Nutrition programmes. Another shared form is 'Maternity Ward Report', shared with ZACP and respective hospital administration. In both forms that seem to collect shared data, and a number of other forms which do not have apparent sharing of data, there is a number of registers used to collate data to feed to these monthly summaries.

RCH took active role in the new HIS participating in the first revision of the data collection tools that led to the integrated and shared tools. The programme also has experienced most frequent needs for form revision. The programme has experienced a change in financial support, initially being supported by the United Nations Population Fund (UNFPA), and later USAID. When USAID came onboard they brought their demands for data, hampering the whole process, which requires the tools to be revised on annual basis and be agreed by all parties. For example, new age categories for family planning clients were introduced, without taking into consideration that these data are being shared with other programmes. No justification was given by the programme, except that the new donor wanted data that way. In addition to these demand, in 2009 the programme hired a consultant to develop new registers to cater for the new data requirements, totally bypassing HMIS. As a result, data needed by different other programmes including Nutrition, ZMCP, and ZACP had to be collected from different format. This sparked lot of criticisms from those programmes and the HMIS Unit which completely rejected the idea. The RCH programme could never justify the exercise to other programmes or to HISP and HMIS Unit, but decided to bow down to the donor's demand without even explaining to them about the existing system.

3.3 ZANZIBAR AIDS CONTROL PROGRAMME (ZACP)

The effect of AIDS pandemic has drawn attention to international community. This effect is also observed in the Zanzibar HIV/AIDS control programme, from service provision to the type of data collected. This scenario is observed through the management of the disease, resources used as well as the politics behind. Number of donors providing financial and technical support to the programme at different times including Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), World Health Organization (WHO), Medicos Del Mundo.

Like RCH, ZMCP was among the early adopters of the integrated HIS, participating in the initial data collection tools design. The initial data collection tools design for ZMCP was the smoothest, where two forms were designed based on the existing two registers for recording data for Sexually Transmitted Infections (STI) and Voluntary Counselling and Testing (VCT) were adopted. These registers were designed and supported by Medicos Del Mundo. The programme also formed the consortia to use DHIS for data capturing, processing and reporting.

Despite being part of the initial design team that also agreed on the use of DHIS, the programme diverted from the system during implementation. Health facilities submitted the monthly summaries to the districts as agreed, but in parallel, the programme maintained that data from the registers be reported and were entered their old Epi Info database, which has been used before DHIS came to place. This database was rarely updated leaving the programme with absolutely no data, since they did not trust the DHIS and at the same time failed to maintain their system. In March 2009 -three years after the integrated HIS was in place, the programme realised the danger of totally missing the data and they decided to consult HMIS Unit to find a solution for the data problems which they were facing.

In order to address the situation, the programme conducted a series of consultative meetings with stakeholders sharing data with them. In these meetings, a number of forms, some never presented before, were brought for discussion. The programme eyed to incorporate all these forms to the general HIS and without causing chaos. The exercise ended with nine forms agreed, including two forms shared with RCH. RCH cleared all issues with ZMCP, for example, forms were synchronised to have similar age groups and also the amount of data to be captured was reduced to include mainly those related to the programme's list of indicators. An interesting debate was on the redesign of HIV Counselling and Testing Monthly Report where the programme introduced new age categories (0-9 yrs, 10-14yrs, 15-24 yrs, 25-34 yrs, 35-44 yrs, 45-54 yrs, 55 yrs+) different from other forms (0-14 yrs, 14-24yrs, 25yrs+). Although all stakeholders from all other programmes agreed on the rationality of having synchronised age categories for related data, the programme managers insisted that the categories should not be changed because they are the ones required by the donors even when they cannot rationally justify. "This form is the backbone of the programme. Just leave it as it is" (ZACP officer, May 2009).

3.4 ZANZ?BAR MALARIA CONTROL PROGRAMME (ZMCP)

For a long period malaria has been a major health problem for the Zanzibar population. Until mid-2000s malaria prevalence was recorded at 40%. The disease was the major cause of death in both adults and children. At the beginning of the millennium, efforts to contain the disease were increased. Several donors are involved in the programme support. These include President's Malaria Initiative (PMI), GFATM, WHO, Italian Cooperation and African Development Bank (ADB). These efforts have resulted into diseases downgrade to a prevalence of less than 1% in 2010 (HIB 2009).

This success has changed the way the programme operates, from focusing on curing the disease to preventing the disease come-back, and hence changing the data needs. Thus, after 2006 when the integrated data collection and reporting system was agreed and the programme fully complied, the programme had to introduce a number of additional data collection tools, both routines and survey based tools in order to cater for the rising data needs. As part of the commitment towards the integrated HIS, the programme agreed to receive data that are only related to malaria tests, incidence and prevalence of the disease for adults, children under five years and pregnant women. Three forms are primary sources of the data: Hospital Admission Form, General Outpatient Report, and RCH Form.

However, to cater for the programmes needs, basically arising from the different donors supporting them, the programme prepared a standard report format in Microsoft Excel featuring all the routine data they needed, and were open to receive data from the integrated HIS that will be populated to their standard format. In return to this commitment, the HISP/HMIS Unit developed a gateway to transfer data from DHIS to the programme's standard format. The DHIS data source was based on the Microsoft Excel Pivot Table developed automatically by DHIS. At the time of this study, ZMCP had no alternative way of getting data from HMIS Unit except by emailing or physically sending a flash disc containing exported data from DHIS, since the DHIS version on place was desktop based. This led to unguaranteed data update to the programme, since HMIS Unit would not routinely send the data, and the Programme could only make a follow up when they are in urgent needs.

3.5 NUTRITION PROGRAMME AND THE EXPANDED PROGRAMME FOR IMMUNIZATION (EPI)

Expanded Programme for Immunization (EPI) and Nutrition are relatively smaller programmes compared to other programmes discussed earlier, though covering the same population. The Nutrition Programme is a relatively less resourced, mainly relying on the Government budget. Thus, the new integrated HIS was a fortunate to the programme, since it would get up to date data with no costs.

The EPI programme is small but well organised programme, funded only by the WHO. The absence of multiple donors makes the programme less resources but at the same time more focused especially on data requirements, contrary to the bigger programmes presented earlier. Throughout, EPI has explicitly demanded data necessary for monitoring and evaluation of their interventions as well as reporting to WHO regional office in Nairobi. This made the data collection tools for EPI the most stable since the

integrated HIS was introduced. Not only was the EPI among the early adopters of the integrated HIS, but also a frontier in promoting the system and data use. Prior to the integrated HIS, the programme had a good history in proper data management, instilling this in the new HIS where the programme has always been pushing for timely data. EPI was the first programme to request the DHIS web version when it piloted in 2010.

The HMIS Unit and the upshot of HIS integration

The new HIS structure gives the HMIS Unit a leading role with responsibilities to prepare and distribute data collection tools to districts which then distribute to health facilities, ensuring proper functioning and use of DHIS at all districts, hospitals, and programmes, as well as ensuring timely data flow to the programmes. The ideal process stages for data reporting include district officers sending DHIS data exports to the HMIS Unit, the HMIS Unit updating the central data warehouse, and after doing necessary quality check, export data and distribute to individual programmes which are supposed to import into their databases. The unit is also responsible for facilitating review of the whole HIS in order to keep pace with the evolving data needs, as well as technical support to all DHIS implementing nodes, including districts, zones and programmes.

In order to perform these assignments a well-experienced and well-resourced unit is needed, contrary to the actual situation as discussed. Consequently this led difficulties in undertaking its responsibilities and hence affecting the whole implementation process.

3.6 INSTITUTIONAL CAPACITY OF THE HMIS UNIT

Despite the critical responsibility assigned to the HMIS Unit the unit is far outweighed by the programmes it is supposed to serve, both in terms of human and financial capacity. Almost a decade after HMIS unit was established in 2001, the unit had four skilled staff filling the positions of the head, assistant head and two information technology (IT) specialists. The rest of the staff were adopted from the then statistics unit and are only capable of performing clerical works. The two IT specialists are responsible for managing the IT infrastructure of the whole Ministry of Health. Consequently, the unit has not been in position to do the stated responsibilities, and instead had to highly rely on HISP consultants, who also have their contractual obligations which are not always aligned with what the HMIS Unit wants at that particular time. This rose the fear over reliability of getting timely data, and causing a loophole for some programmes' non-compliance.

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he HMIS Unit has experienced limited financing. Since project inception, the unit has been financially supported by DANIDA only, with MoH taking care of salaries only. However, apart from data collection forms printing and workshop financing DANIDA was not covering extensively the work of the HMIS Unit, the same way it covered the districts budgets. DANIDA maintained a policy of not giving fund to purchase motor vehicles, and being the sole financier this constraining the HMIS Unit capacity on

making follow-up to districts and health facilities. In 2009 the Italian Cooperation joined effort, though funding only small portion and focusing on training only. There was also budget limitation on the areas which can be funded. While the HMIS Unit experienced limited financing, the programmes, as mentioned earlier have been enjoying a substantial support from the different donors. Combining to the manpower problem this has escalated the HMIS Unit ability to reach both the lower levels for support as well as data supply to the programmes. As a result reluctant programmes such as HIV/AIDS and RCH got an excuse.

3.7 MOH BUREAUCRACY AND THE POSITION OF THE HMIS UNIT

Another challenge relates to the formal organisation procedures. While the unit is mandated to oversee the all HIS activities, the unit does not have any managerial authority to the zonal, district and health facility staff, who according to the HIS hierarchy are key personnel on data collection. Data are collected by health facility staff and district staff are responsible for picking up the filled in summary forms which they enter into a computer system (DHIS) at their respective districts. If any of these staff fail to do the work, the HMIS unit does not have the mandate to formally question them let alone sanctioning. The authority is given to Zonal offices, which are formally responsible for all districts and health facility staff. However during the HIS implementation, accidentally zones were bypassed, overemphasising the activities at the district level, partly due to pressure to deliver. When the district staff failed to work, the zonal office especially Unguja blamed the HMIS Unit for bypassing them. This is when district health officers and administrators who were trained to work for DHIS refused to work in many districts. In those districts the staff were occupied with other programmes related activities which are financially attractive to them.

The third challenge is the centralisation-decentralisation dilemma in the HIS setup. The philosophy behind the new integrated HIS is based on integration in the sense that all stakeholders are meant to get data from a unified system, enabling data sharing among programmes and reduce work redundancy, and consequently minimise cost and improve data quality. It also advocate for decentralisation, meaning a freedom is given for all the levels to analyse and use data within their respective offices. In principle, this is well facilitated by DHIS. This decentralisation is intended to enable managers at all levels of healthcare management to use the data for the management at their respective levels.

In practice however, the envisioned data decentralisation did not take place, at least in the first years. The HMIS Unit found itself with the sole authority of distributing data to programmes, making it data 'vertical programme'. From 2006 to 2008 all data from all districts were channelled through the HMIS Unit as the de facto standard procedure, and programmes would receive the data from them. This caused unnecessary bureaucracy delaying the data to programmes, who are the primary data users, which in turn increased their scepticism towards the new HIS.

To address the issue of data delay an alternative solution was introduced by HISP in 2009 where districts could send data to zone, HMIS unit and all programmes as an

email copy to each, where the programmes will download the data export and update their databases. However, this did not work out the way it was expected. Until the end of 2009, only EPI fully supported the new data reporting standard procedure. EPI routinely updated their database analysing the data for the programme use and subsequently sending data to WHO regional office in Nairobi, which is the programme's sponsor. Despite low … Second, some officers in the HMIS Unit felt the new system will undermine the unit since it will pull out its authority as the main data stakeholder. For example, in one case a senior officer at the unit dismissed data that were distributed to RCH directly by HISP consultant under the reason that the data had to go through 'formal' channel. To them, the formal channel is to go through the HMIS Unit and shall only be distributed to programmes after the unit's approval.

4. DISCUSSION

The empirical case shows the institutional contexts of HIS living together. The first institutional context is the promoted integrated HIS under philosophical rationality of shared, effective and cost effective HIS. The second context is the long established vertically managed HIS reflecting the service provision system. With the rationality of shared, effective and cost effective HIS, the later is considered inept in an environment where the ministry of health struggles to improve the health and well being of the people. This scenario dubbed institutional dualism (Heeks and Santos, 2009; Brinkerhoff and Goldsmith, 2005) is the result of tensions between different actors; programmes in one side, and the HMIS Unit (accompanied with HISP) on the other side. Tensions also arise between programmes themselves. These tensions are the result of power asymmetry in resource viewpoint (Nyela and Mndeme, 2010) that feature the HIS integration process.

Moreover, the logics behind the old, fragmented HIS are different from those of the newly introduced integrated HIS. In institutional terms, this is referred as institutional logics (Friedland and Alford, 1991; Thornton and Ocasio, 1999; Scott et al., 2000). This is far different from integrated approach built on the logics of sector wide performance, efficiency in data collection, improved data quality, and sharing of information. Both the programme based HIS and integrated approaches are supported by both internal and external players. Thus, moving to the integrated HIS approach is the process of intermingling of these conflicting logics, and the dominant logic rise among them or as a hybrid of the conflicting logics. This process, among other factors, is highly affected and determined by power structures that feature the healthcare sector.

This emanates from power vested to the various stakeholders. This power is exercised in the day to day routines that also involve and affect the overall IS process. In attempt to contain these power tensions, system designers always need to make right choices on the decisions over "what to integrate, when, where and with whom" (Sahay et al., 2009).

While relying on one donor was effective for EPI, which escaped multiple donor requirements, this has positive and negative impacts for HMIS Unit. The negative impact comes from the inscribed donor procedures to the programme implementation.

Due to the prolonged fragmented system of both service provision and data collection, staff were more obedient to programmes which provided lucrative assignments rather than ill financed HIS activities.

THE LOGICS OF INSTITUTIONS AND INSTITUTIONAL DUALISM

In discussing the institutional dualism of HIS integration, it is important to identify the three groups of actors involved -donors, programmes and the HMIS Unit. Out of the three groups, the donor and programme in one side, form an alliance in which the creation of the new institutional context -the integration seems to interfere with what the alliance is used to. The discussion here does not aim at questioning whether the institutional arrangement of the new HIS is valid, rather to examine the duality that arise as a result of introducing the new system. With no doubt, the integrated HIS is the better way of achieving effective HIS for the sake of sector planning, monitoring and evaluation. However the achievability of the integration phenomena is an interesting discussion. Programmes are the key service providers. In a long period they also used to collect the data independently from each other, and in both cases -service provision and data collection, they seek to legitimise the accumulation of resources. Donors, in their side use the data collected by the programmes to justify their presence and seek more support from their financiers.

TALKING ABOUT POWER

As it was observed in other studies, health programmes in Zanzibar also do not consider the 'data for action' rationality, rather reporting and collecting data as per donors' demand is the major driving factor. Two examples justifying this point were given in the case description; first, the HIV/AIDS programme's resistance to change age structure of the Counselling and Testing monthly report form. Here the programme officers opted to accommodate age structures that are different from all other forms and that are not linked to any of the agreed indicators, simply because the donor wanted the forms that way and they are the principal financier of the programme. The second example is the RCH decision to accept consultation for data collection tools review which simply was done after changing the sponsor. This not only disturbed other programmes which also want to be clean to their sponsors, but also downplayed the whole HIS integration efforts. Thus, power exercised by the donor as a result of their financial contribution was a source of tension in the HIS integration efforts.

The HIS integration project depicts power interplay between the actors, in two dimensions. The dimension of resources, where the alliance of programme-donor imposes difficulty in the enactment of the new institutional context -the integration. This dimension is more visible when different donors cause tension in the HIS design process. The case of normalising age categories for HIV/AIDS programme demonstrates this situation. Ultimately, this has an impact on the design and hence efficiency of the HIS itself. For example, the compromise made resulted into having more data element categories. Another tension is when actions by one programme

interfere with other programmes. This is demonstrated by the RCH consultancy that required other programme interference on the data type categories.

The second explicit power play is seen from authority dimension. Furthermore it can be seen from our case that, power derived from the resource side surpass authority. Despite the agreement on integration and the design of the integrated data collection system, the programmes' institutional arrangements are however still in fragmented settings. This adds another level of complexity to realigning the two institutional contexts. A solution proposed to speed the data reporting and to virtually reduce bureaucracy was however technically met with resistance from the HMIS unit itself. Though, it was agreed in principle, however to some of them this was seen as threat as they would curb the power (even if little) already attained by the unit.

5. IMPLICATIONS

This paper empirically contributes to the discussion established by Brinkerhoff and Goldsmith (2005) and extended by Heeks and Santos (2009) on institutional dualism and particularly in HIS integration in the context of developing countries. The paper provided empirical evidences demonstrating how what is widely considered as rational can be overpowered by agendas imposed by powerful players in the contested fields, a common scenario in developing countries, where donors dictate what should be done. While the previous studies considered the institutional dualism in the form of formal-informal dichotomy, this study extended this discussion by bringing a scenario where two rationalities (both formal) compete and how power play determines which rationality prevails.

REFERENCES

Alexander, I. (2004). "The Business of Systems Integration." European Journal of Information Systems **13**: 160 - 161.

Bachrach, P. and M. S. Baratz (1962). "Two Faces of Power." The American Political Science Review **56**(4): 947 - 952.

Baxter, P. and S. Jack (2008). "Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers." The Qualitative Report **13**(4): 544 - 559.

Bostrom, R. P. and J. S. Heinen (1977). "MIS Problems and Failures: A Socio-Technical Perspective, Part II: The Application of Socio-Technical Theory." MIS Quarterly **1**(4): 11 - 28.

Bostrom, R. P. and J. S. Heinen (1977). "MIS Problems and Failures: A Socio-Technical Perspective. Part I: The Causes." MIS Quarterly **1**(3): 17 - 32.
Brinkerhoff, D. W. and A. A. Goldsmith (2005). "Institutional Dualism and International Development: A Revisionist Interpretation of Good Governance." Administration and Society **37**(2): 199 - 224.

Cavaye, A. L. M. (1996). "Case study research: a multi-faceted research approach for IS." Information Systems Journal **6**: 227 - 242

Chilundo, B. and M. Aanestad (2005). "Negotiating Multiple Rationalities in the Process of Integrating the Information Systems of Disease-Specific Health Program." Electronic Journal of Information Systems in Developing Countries **20**(2): 1-28.

Foucault, M. (1979). Discipline and Punish: The Birth of the Prison. New York, Vintage Books.

Friedland, R. and R. R. Alford (1991). Bringing society back in: Symbols, practices, and institutional contradictions. The New Institutionalism in Organizational Analysis. W. W. Powell and P. J. DiMaggio. Chicago, University of Chicago Press**:** 232 - 263.

Hasselbring, W. (2000). "Information Systems Integration." Communications of the ACM **43**(6): 33-38.

Heeks, R., D. Mundy and A. Salazar (1999). Why Health Care Information Systems Succeed or Fail. Information Systems for Public Sector Management. Manchester, Institute for Development Policy and Management.

Heeks, R. and R. Santos (2009). Understanding Adoption of e-Goverment: Principals, Agents and Institutional Dualism. iGoverment Working paper Series. Manchester, Centre for Development Informatics. Institute for Development Policy and Management, SED. University of Manchester.

Heeks, R. B. (2003). Design-realty gap assessment. Manchester, IDPM, University of Manchester, UK.
HMN (2008). Framework and Standards for Country Health Information Systems. Geneva, World Health Organisation.

Klein, H. K. and M. D. Myers (1999). "A SET OF PRINCIPLES FOR CONDUCTING AND EVALUATING INTERPRETIVE FIELD STUDIES IN INFORMATION SYSTEMS." MIS Quarterly **23** (1): 67 - 94.

Lukes, S. (1974). Power: A Radical View. London, Macmillan.

Orlikowski, J. and S. R. Barley (2001). "Technology and Institutions: What can Research On Information Technology and Research on Organizations Learn from each other?" MIS Quarterly **25**(2): 145 - 185.

Piotti, B., B. Chilundo and S. Sahay (2006). "An institutional perspective on health sector reform and the process of reframing health information system: Case studies from Mozambique " The Journal of Applied Behavioral Science **42**(91): 91-109.

Pope, C., P. van-Royen and R. Baker (2002). "Qualitative methods in research on healthcare quality." Qual Saf Health Care **11**: 148 - 152.

Qureshi, S. (2009). "Assessment of the Social Factors in Information and Communication Technology Access and Use." information Technology for Development **15**(4): 235 - 236.

Sahay, S., E. Monteiro and M. Aanestad (2009). "Configurable Politics and Asymmetric Integration: Health e-Infrastructures in India." JAIS **10**(Special Issue): 399-414.

Sautet, F. (2005). The role of institutions in enterpreneurship: Implications for development policy. Washington, DC, George Mason University.

Scott, R. W., M. Ruef, P. Mendel and C. Caronna (2000). Institutional Change and Health Care Organizations: The Professional Dominance to Managed Care. Chicago, University of Chicago Press.

Scott, W. R. (2008). Institutions and Organizations: Ideas and Interests. Los Angeles, Sage Publications.

Sheikh, Y. H. and O. Titlestad (2008). Implementing Health Information System in Zanzibar: Using Internet for Communication, Information Sharing and Learning. IST Africa 2008. P.

Cunningham and M. Cunningham. Windhoek, Namibia, IIMC International Information Management Corporation.

Thornton, P. and W. Ocasio (1999). "Institutional Logics and the Historical Contingency of Power in Organizations: Executive Succession in the Higher Education Publishing Industry, 1958-1990." American Journal of Sociology **105**(3): 801 - 843.

UN (2008). The Millennium Development Goals Report 2008. U. Nations. New York.

UnitedNations (2000). Report of the High Level Panel on Information and Communication Technology. New York, United Nations.

Walsham, G. (1993). Interpreting information systems in organizations. New York, John Wiley & Sons, Inc.

Walsham, G. (2006). "Doing interpretive research." European Journal of Information Systems **15**(3): 320 - 330.