

Challenges in Health Information Systems Integration: Zanzibar Experience

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Abstract. The health care milieu of most developing countries is characterized by multiplicity of vertical programs supported by myriad of donors. Often, the vertical programs maintain their own uncoordinated information systems which are in conflict with the primary health care goals of integrated district based health information systems. While some countries have managed to integrate the vertical reporting systems into the national HIS, ensuring reliance and continuous use of the integrated HIS by the programs' managers is still a big challenge. The fragmentation of the HIS after integration, ensuing from the non reliance and compliance to the integrated system, has not received much attention empirically or analytically. Most of the contemporary research in HIS integration focused on the challenges in the process of achieving integration. The paper advocates the need to understand the nit gritty of what goes on after implementation which as the case suggests, presents enormous challenges to the HIS integration initiative. By drawing on an empirical case, the study revealed the tensions that exists between the ministry of health which strived to standardize and integrate the HIS and the vertical programs which pushed the agenda to maintain their systems alongside the national HIS. However, as implied from the study, attaining integration entails the ability to strike a balance between the two forces, which can be achieved by strengthening communication and collaboration linkages between the stakeholders and making use of gateways.

Keywords. Health information systems, Integration, Standardization, Vertical programs

1. Introduction

Health information systems (HIS) in developing countries have in recent years received significant attention by both health care practitioners and the Information Systems (IS) research community. This result partly from increasing efforts by governments, international agencies, NGOs, and other development partners seeking to improve healthcare services through various interventions and approaches. In that regards, HIS is perceived as a tool for monitoring and evaluation of the interventions, to measure progress towards set out goals and targets.

In the year 2000, the United Nations set aside ambitious quantifiable goals and targets against which to measure progress in health. One of the ambitious goals was geared towards achieving *health for all*, through implementation of the primary health care (PHC) approach.²³ Consequently, most developing countries are implementing the PHC approach, as part of the general health system reform process. However, implementation of the PHC approach in most countries is organized in disease-focused

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and specific services programs (Malaria, HIV/AIDS, TB & Leprosy and Family Planning programs, etc), dubbed as 'vertical programs'.^{2,5,12,13} The vertical programs are mostly funded by various donors who come with specific requirements related to the monitoring and evaluation of their funds and the program at large. For the case of Zanzibar for instance, the HIV/AIDS program alone is supported by a number of donor agencies such as the Global fund, Center for Disease Control (CDC), United Nations for Development Program (UNDP), United Nations Children's Fund (UNICEF), World Bank and the World Health Organization (WHO). Almost each agency has a number of indicators which require huge amount of data to be collected.

As the result of the donor pressure associated with the multiple vertical programs, the HIS evolved in a rather chaotic and fragmented manner, with multiple and overlapping demands from both the vertical programs and the national health administrative departments and ministries. The vertical programs usually maintain their own 'vertical' reporting information systems existing alongside with the national health information system. The result emerging over time is uncoordinated, disintegrated and heterogeneous collection of systems.^{8,12} Thus, many studies have reported the dismal state of the HIS as being predominantly unreliable, irrelevant, ineffective and therefore inadequate in providing the management with the needed information.^{3,8,12,13,15}

As an attempt to ensure availability and accessibility of comprehensive health information at the national health departments, districts and the vertical programs; most countries are pursuing an integration strategy of the fragmented systems. While some countries have managed to standardize and integrate some of the vertical programs into the national HIS, ensuring continuous use and reliance to the integrated system by the vertical programs' managers is still a big challenge.¹⁶

The fragmentation of the HIS after integration, ensuing from the non reliance and compliance to the integrated system, has not received much attention empirically or analytically. Most of the contemporary research in HIS integration focused on the challenges in the process of achieving integration. For instance, ¹ examined the potential and challenges of integrating the HIS of Malaria, TB and HIV/AIDS programs and the integration of multiple reporting channels within each program. Another study looked at the challenges posed by the historicity (the conservative influence of historically accumulated and institutionalized practices, technologies and perceptions) and heterogeneity (lacking integration and increasing fragmentation across the collection of information systems) of information systems in the development and integration of the health information systems.⁸ Furthermore, ⁹ looked on the problems of fragmentation and challenges of integrating the routine health information system and the prevention of mother to child transmission program (PMTCT).

The thesis of this paper is the emphasis of the need to comprehend the nit gritty of what goes on after integration. By specifically understanding the way vertical program managers (as users of the HIS) receive and relate to the newly implemented system, can help us answer though partly, as to why some HIS integration in the context of developing country fail or run short of expectations, after implementation.

The rest of the paper is organized as follows. The literature covering HIS integration challenges in developing countries is presented. Then, the research context and the research methodology followed in the study are set forth. The empirical underpinning of the paper is an integration effort in Zanzibar presented next and followed by the analysis and discussion section. Finally, the paper ends with a conclusion section where implications and contributions of the study are spelt out.

2. HIS Integration Challenges

HIS integration in developing countries is considered as an approach towards rationalization and unification of disparate systems, with an objective to provide easy and equal access of relevant information to all stakeholders.¹² However, ensuring an integrated HIS in these settings is quite a big challenge.

Generally, the challenges of HIS integration emanate from both social and technical factors¹³ surrounding the integration processes. It is argued that it is more so in developing countries due to contextual particularities related to politics, institutional conditions, high resource constraints (infrastructure, human resources, financial resources), high disease burdens and the particularities of the diseases, in which all together challenge the process of integrating the HIS.^{1, 17}

Most of the developing countries are funded by international donor agencies such as the World Bank, Global fund, and the Clinton Foundation, in order to support provision of health services (such as Family Planning, and Immunization) to the population. However, donor policies tend to support implementation of disease specific programs dubbed '*vertical programs*' which maintain their own management structures and information systems [2]. Quite often than not, the administrative structures and the systems are in conflict with the primary healthcare goals of integrated district based health information systems. In Zanzibar for instance, the HIV/AIDS program alone which maintains its own information system is supported by more than six international donor agencies. And almost each agency has specific requirements concerning data to be collected.

In a study on HIS of the disease specific programs in Mozambique, a low income country,¹ identified major challenges related to the integration of the HIS to include heterogeneity of interests among donors, managers and health reformers; multiplicity of reporting systems even within an individual program and high disease burden. Furthermore,¹⁹ discussed how poor infrastructural conditions and lack of transport challenge the flow of health information from the district to the provincial levels of the health administration hierarchy. Other studies reported how low or lack of computer skills contributed to the challenges to attain an integrated district based HIS, especially in the rural context of most developing countries.^{6, 8}

Moreover, lack of uniform infrastructure development and uneven distribution of resources (Human resources and computers), challenge the efforts to attain comprehensive integrated health information system.^{4, 18} For instance, in Mozambique the uneven distribution of human and technical infrastructure was reported as being problematic to the effort of scaling up the district-based health information systems because some of the remote districts did not have electricity. Similar problems of uneven infrastructure development was experienced in Ethiopia, where according to¹⁸, use of standardized data formats served as gateways between the paper based systems at the periphery levels and computer software at the higher levels of the health system hierarchy. Moreover,¹⁰ alluded to some of the challenges faced by most developing countries in achieving standardized and integrated HIS to include conflicting interests between health programs which make it difficult to reach a "final" agreement; changes being the only constant, where new needs keep popping up (e.g. HIV/AIDS); and multiple software and paper tools which are difficult to coordinate and change.

However, some countries have managed to standardize and integrate some of the vertical programs information systems into the national HIS, but ensuring continue use and reliance to the integrated HIS by the vertical programs managers is still a big

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challenge.¹⁶ As reported by²⁰, some of the reasons for the categorical programs refusal to support an integrated HIS include fear that their requirements will not get the attention needed to ensure that their needs are met, and if the programs have pride of ownership in their existing vertical systems which meet their needs.

The fragmentation of the HIS after integration, ensuing from the non reliance or refusal to support the integrated system, has not received much attention empirically and analytically by the contemporary research in information systems integration. As the literature depicts, much of the research focused on the challenges in the process of achieving integration. The argument of this paper is the need to comprehend the nit gritty of what goes on after integration. By understanding the way vertical program managers (as users of the HIS) receive and relate to the newly implemented system, can help to answer though partly as to why some HIS integration in the context of developing country fail or fall short of expectations after implementation.

3. Research Context and Methodology

The research study was conducted in Zanzibar. Zanzibar is a semi-autonomous region within the United Republic of Tanzania, and is made up of two main islands, Unguja and Pemba. Zanzibar has an area of 2,332 square kilometres divided into five administrative regions. Each region has two districts, making a total of ten districts. Zanzibar maintains its 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 'HMIS unit' is used to refer to the national level MoHSW department, responsible for the health information system.

The empirical materials are based on an ongoing effort supported by the Danish International Development Agency (DANIDA) to standardize and integrate the HIS in Zanzibar. The implementation of the project is done within the Health Information System Programme (HISP). HISP is a South-South-North collaborative health information systems research programme comprising of a number of countries from Africa, Asia and Europe (Norway). By drawing on the support from DANIDA, the HISP team in Zanzibar in collaboration with other stakeholders (MoHSW, and vertical programs managers) started to engage in the standardization and integration of the HIS from 2005. For more information on the project refer to¹⁴. The author of the paper took the role of a participant observer as part of his research studies at the University of Oslo.

Case study methodology was drawn upon in the field during data collection and analysis. Case study is an appropriate approach for bringing an understanding of a complex issue, which could be a program, event, an activity or a process involving one or more individuals and using a variety of data collection procedures over sustained period of time.¹¹ The aim of the research being to develop a comprehensive understanding of the challenges related to the way users received and engaged with the integrated HIS, case study proved to be a feasible approach.

The research was carried out in three health districts; two in Unguja and one in Pemba Island within a period of five months (June to November, 2006).The districts

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visited in Unguja were Urban and West; both of them located on the west region of the island. Most of the MoHSW main offices such as HMIS unit and vertical programs' offices are located in these two districts. In Pemba the research was conducted at Chakechake district, located on the southern region of the Island.

Semi structured interviews were used, where interviewees were asked open ended questions to elicit their viewpoints related to the use of the integrated HIS. At the health unit level, 38 informants were interviewed, 19 in Unguja and 19 in Pemba, where impressions and perceptions of the health workers in relation to the previous and the newly integrated HIS were gathered. The goal was to learn micro level challenges emanating from the way users responded to the integrated HIS. At the macro level the interviews involved the following informants: District medical officers, District health officers, vertical programs district and general managers and central level HMIS unit officials. During the interviews different informants' viewpoints in relation to the new datasets and tools were gathered. Table 1 depicts the number of informants interviewed.

Name /Position	Informants
Health unit level staff	38
District Medical Officers	3
Vertical programs data managers	7
Programs general managers	2
National level HMIS unit officials	3
District Health Officers	3
HISP team members	2
TOTAL	58

Table 1: Interviews conducted at health facility and above

A number of documents and software tools were analysed in the field. For instance the district implementation plan was analysed in an attempt to understand the use of the new system in the preparation of the plan. The software tools were analysed to assess compliance to the newly integrated system.

4. Case Description

The health information system in Zanzibar was organized haphazardly and mainly shaped by the organization of fragmented vertical programs with their own information systems.¹⁴ The vertical programs include the Family Planning (FP), Malaria, and Expanded Program on Immunization, Tuberculosis and Leprosy, Nutrition, HIV/AIDS and Safe motherhood programs. Most of the programs' services are integrated at the health unit level, but maintain separate reporting systems. A situational analysis of the health information system disclosed plethora of problems which included scarcity of resources, gaps in data collection tools, poor analysis of data, fragmentation of the higher levels, poor feedback and lack of motivation and limited information use.¹⁴

As an attempt to improve the situation, a strategic plan was drafted by a joint team of stakeholders; comprising both scientific and organizational researchers, major Ministry of Health and Social Welfare (MoHSW) donors (DANIDA and WHO), University of Oslo and some officials from the MoHSW (ibid). The roadmap detailed and agreed on the major activities to be undertaken. The University of Oslo under its action research program called Health Information System Program (HISP), was

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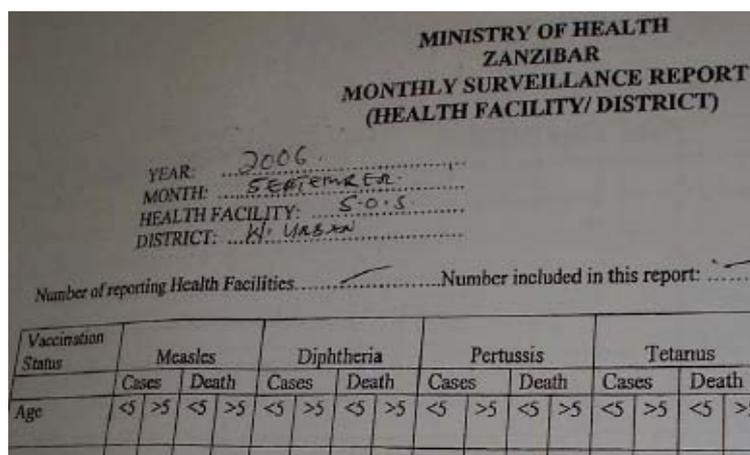
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contracted to undertake the task of restructuring the system by way of integrating the highly fragmented HIS. HISP as explained hitherto is a research network that aims at enhancing district health information systems in developing countries through introduction and local adaptation of open source software. The software which is known as District Health Information Software (DHIS) was developed and adapted in South Africa and subsequently adopted in other countries such as Malawi, India, Ethiopia, Namibia, Zambia, Mali, Botswana, Vietnam and Nigeria.

The HMIS restructuring process followed a participatory and incremental approach in the revision of the previous datasets and creation of new once. The incremental approach paved way for the involvement of key stakeholders in each stage of the revision exercise. Among the new datasets included was the Expanded Programme on Immunization (EPI), Disease surveillance, Reproductive and child health (RCH), STI and HIV, and Maternity dataset. Almost each dataset brought together a number of stakeholders, for instance the Disease surveillance dataset apart from the national HMIS, had two main stakeholders, the EPI and Malaria programs. Malaria program in Zanzibar is very strong unlike in other countries due to many interventions by donors directed towards reversing the malaria trends in the country. This made malaria related data more valuable purposely because of the need to monitor and evaluate the interventions. The disease surveillance being the main source of the malaria data, the program was involved in the design implementation stages to ensure that the dataset met the requirements needed. For instance, the program’s data manager was involved in the training of the new disease surveillance dataset. However, despite of the involvement, the data manager enacted separate data collection tool behind the scene and circulated it in some districts. When asked why, the answer was very clear,

“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 tried to design it to show them how it should look like” (Manager, Vertical program, August, 2006)

Likewise, the EPI Disease surveillance tool (see Figure 1) was integrated in the new dataset for disease surveillance.



**MINISTRY OF HEALTH
ZANZIBAR
MONTHLY SURVEILLANCE REPORT
(HEALTH FACILITY/ DISTRICT)**

YEAR: 2006
 MONTH: SEPTEMBER
 HEALTH FACILITY: S.O.S.
 DISTRICT: Kilimo

Number of reporting Health Facilities: Number included in this report:

Vaccination Status	Measles		Diphtheria		Pertussis		Tetanus			
	Cases	Death	Cases	Death	Cases	Death	Cases	Death		
Age	<5	>5	<5	>5	<5	>5	<5	>5	<5	>5

Figure 1: Monthly disease surveillance report

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Although the new dataset was running for more than eight months (till the time of the fieldwork), still EPI kept on collecting data using their system. The reason, as explained by one official was that,

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

The aftermath of that practice was duplication of work at the point of data collection. Similarly, in some districts, family planning was running in parallel with the new integrated system despite the fact that it was integrated in the RCH dataset, and monthly submitted to the district. When some health workers at the health facility level were asked why, one of them answered,

“.. The new forms do not have all the required data elements as the old ones. So we fill in the old one to make sure that all the required information is taken to the owners (the Family Planning program)” (RCH coordinator, July 2006).

Another health officer noted,

“We have not been told to abandon them; we still submit them monthly to the district.” (MCH Aides, August 2006).

At the district level some data officers kept on demanding submission of the family planning report using the separate data tool. This was partly attributed to by the inadequate knowledge about what was supposed to be done as far as the old and the new reporting system was concerned. Lack of teamwork and sharing of information at the district level between those who participated in the design process and those who didn't led to this malady. For, most of the HMIS work at the district level was in most cases done by those who were not involved in the process of designing the new data collection tools.

HIV/AIDS was another program which despite being involved in the process of designing new dataset for HIV and STI services, kept on running their previous tools separately. This program maintained its own fragmented information system, one for VCT and another one for STI services. These subsystems were integrated into one 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 HIV/AIDS program. Instead, the program kept on depending entirely on their previous systems. The reason given was that the new dataset does not fulfil data requirements for program management and so it was not designed for the HIV program but for the HMIS unit.

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

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Though the program officers participated in the design process of the dataset, the participation as explained by one officer was meant to help HMIS unit get HIV/AIDS related data. Lack of trust by the vertical program to the capacity of HIMIS unit to maintain and sustain the information system was envisioned as one of the reasons:

“..... Mostly we rely on donors in almost everything which sometimes lead to mistrust by the vertical programs of our capability to maintain and sustain the information system.

For instance EPI are performing well because they have enough funds. Also HIV/AIDs have many donors which imply enough funds, unlike HMIS which has very scarce resources both physical and human resources”. (HMIS Official, July, 2006)

As an attempt to resolve the dilemma according to the HMIS official, the HMIS unit resorted to participatory approaches such as meetings, workshops and seminars to build consensus. An example being mobilization of concerted efforts and funds by HMIS unit to resolve availability of data collection tools problem. The problem occurred when HMIS failed to fund production of data collection tools due to financial constraints. To resolve the problem which if left unsolved would have undermined the whole system, vertical programs as one of the major stakeholders were summoned in a meeting to deliberate and agree on strategies to solve the problem. In the meeting, it was agreed that vertical programs contribute on the production of data collection tools. Most of the programs considered the idea as one of the feasible solution for the problem. Those who were at first reluctant, slowly as they saw others responding, they also followed suit. Based on the agreement, production of both primary and secondary data collection tools to be used for a period of one year was done using funds from different vertical programs.

In an attempt to explain the reason and solution for the continued use of the previous systems one stakeholder from the donor community argued:

“We have agreed if possible not to talk about integration. For when people working in these disparate systems hear this, they think of being robbed of their jobs and hence their salaries. This problem is more pronounced in this context where there is massive unemployment rate. We better talk about communication and collaboration between the vertical programs and the HMIS unit” (Program director, Donor Community; Nov, 2006).

5. Analysis and Discussion

The integration of the health information system (HIS) involved standardization of the datasets, data collection tools, data processing tools and associated work practices; and institutionalization of the standards to the levels of the health system. Following is the analysis and discussion of the challenges resulted from the way vertical program managers received and related to the newly integrated system.

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5.1. Limited use of the integrated HIS

The integration initiative sought to align different disparate fragmented information systems to form an integrated data repository at the district level which gives access of data to different stakeholders. Though, this was achieved to a certain degree, some other vertical programs whose datasets were aligned with the new initiative enacted limited use of the newly integrated HIS by running some of their previous information systems and tools in parallel with the new system. For instance, the disease surveillance dataset for EPI program was aligned with the national disease surveillance standard. Though the national dataset was in operation for more than eight months until the time of writing, the vertical program managers decided to run their disease surveillance data collection tool in parallel with the national system. This vertical program however had another dataset (on immunization) which was aligned with the new initiative and which was running smoothly. The immunization dataset is an independent dataset, with the EPI program as the main stakeholder. This is different from the disease surveillance dataset which was formed by fusing together the national disease surveillance dataset and the EPI surveillance dataset. To regain control of their disease surveillance reporting system, the program managers decided to run their dataset alongside the integrated dataset for disease surveillance.

Furthermore, the limited use came to play as the result of the lack of trust by the vertical program managers to the capability of HMIS unit to ensure sustainability of the integrated HIS. This was evident from one of the program manager's assertions that, *unless we are sure of getting our data, we cannot abandon our system*. Therefore, the managers drew on the history of poor economic status of HMIS unit and on their future prospects about the new system's sustainability to make the decision to maintain their system alongside the new system.

Another health program whose users enacted limited use of the new system was the family planning. In some districts, family planning dataset was running in parallel with the newly integrated system despite the fact that their data elements were integrated in the RCH dataset. This resulted as users drew on their past practices of submitting huge amounts of data to the vertical programs unlike in the new standardized RCH tool where the family planning data elements were minimized. Most of the users argued that they were using the old tools to ensure that information owners get all the information they needed. In addition, by building on their past practices, some district officers kept on enquiring about the separate family planning reports from the health facilities.

Health officers in some districts drew on their limited knowledge of DHIS software to enact limited use of the integrated HIS, where preparation of monthly reports was done by aggregating manually a number of datasets, an exercise which took two to three days to finish. While at the same time, all datasets were already entered in DHIS by the data clerk, in which a monthly report could be printed out without much hurdle. The decision to go back to the manual systems can be envisioned as to have been made due to the dilemma of not knowing how to use the new systems but also by the demand of the need to compile monthly reports.

Other district health officers enacted limited use by engaging themselves more with a dataset for a particular vertical program. This came to play as the result of the officers drawing on their past experiences of vertical system mindset contrary to the

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new integrated HIS where all the datasets needed to be afforded equal attention. This was evident from what one health officer provided as an answer when he was confronted for poor performance of some datasets, where he asserted that his responsibility was a particular dataset whose performance was good. The limited engagement with the integrated HIS was further observed at the health unit level where health workers dealt with particular datasets more than others. This limited use at the health unit or district level came to play as users acted on their past practices related to vertical programs to conceptualize the new system which entailed equal treatment of all datasets to ensure availability of comprehensive data at all levels.

5.2. Completely non-use of the integrated HIS

Some other actors determined to completely shun away from the newly integrated HIS in spite of the fact that they were involved in the design process of datasets related to their program. HIV/AIDS program managers participated in the design of a new dataset called STI and HIV dataset, which aimed at collecting data related to both services. However, this dataset was operational for about five months until the time of writing, but since then the data collected was not fetched and used by the program. The idea of having both systems running in parallel may sound logical, because the setup gives every stakeholder access to the data; contrary to the previous systems where data was vertically submitted to the programs and donors. However, the setup has enormous implication on the workload to the data collectors. Rather than rationalizing the fragmented systems and minimize duplication of data, the setup intensify it and ultimately jeopardize the quality of the data collected.

The non-use of the integrated HIS, came to play as the program officers' drew on a number of assumptions and on their multiple needs of data. Some of the assumptions in relation to the new system are that, *the new system was for HMIS unit*, and so their participation aimed at helping them get their data and that *the data collected in the new system did not satisfy their needs*. The assumptions can be envisioned to have resulted from users drawing on their past experiences of collecting multiple data and on their desire for data to meet future needs.

The non-use enacted by the HIV program as was the case for the limited use explained above, was also mediated by the poor economic conditions of the HMIS unit. Consequently, this led to mistrust of the vertical program to the capability of HMIS unit to ensure sustainability of the system over a period of time, taking into account its almost total dependency on donors.

5.3. Tensions in the HIS Integration

The picture resulting from the limited and non-use of the newly integrated HIS, is what I dubbed as '*pulling effect*' (see figure 2). On one side HMIS unit under the MoHSW is struggling to standardize and integrate the fragmented information systems and on the other side the vertical programs opted for limited and non-use of the newly integrated HIS by maintaining their own systems. The upshot of that is a *pulling effect* on either side, where the winner is determined by the power (in terms of funds, human resources, good strategies.) which one has in order to *haul* the opponent.

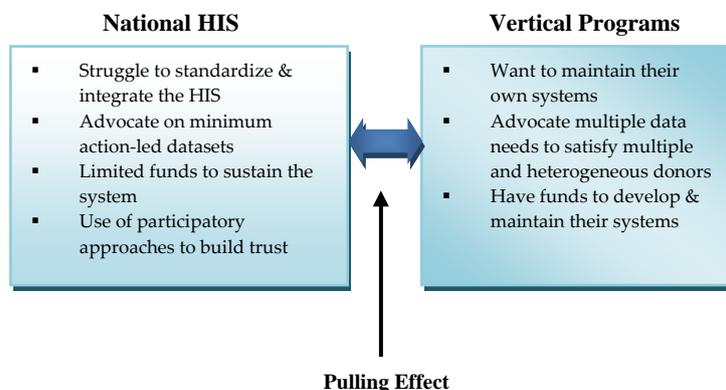


Figure 2: Tensions between the national HIS and the vertical programs

In an attempt to alleviate or eliminate the tensions, the HMIS unit ventured to consensus building through participatory approaches (PA) like meetings, workshops and seminars to try to strike a balance between the two forces. This is exemplified by mobilization of concerted efforts and funds by the HMIS unit to solve availability of data collection tools problem.

Nevertheless, it must be emphasized that the tensions which resulted from limited and non-use of the newly integrated HIS were not static, but dynamic in nature. The level of dynamism was different from one user group to another and from one vertical program to another. For instance, the HIV/AIDs which initially opted for non-use of the integrated system, at the very end of the field study in an interview with the data manager; he sanctioned the software to be installed in their computers. His acceptance came due to the need to make comparison between the data they collect and the HMIS data, supplementing their data in case of some missing data in their systems. Though the manager took the decision after learning that having the new system won't prevent him from using their systems, but I see this as a movement from non-use to limited use. Furthermore, the health units and districts officers who opted for limited engagement by drawing on their previous vertical system experiences, slowly started to change as they learned through informal trainings, feedback meetings and seminars that all the datasets needed to be afforded equal significance. The change from non-use to limited use conforms to the argument that, other embedded practices can be changed or replaced by others over time.¹⁸ However, contextual particularities such as the poor economic status of most healthcare settings in developing countries sometimes reinforce their existence and hence make them hard to change.

5.4. The need to strengthen communication and collaboration linkages between stakeholders

The vertical programs in the Zanzibar case have very strong installed base of information systems reinforced by funds from donors. Moreover, these systems have very well defined and elaborate vertical organizational structures with many people employed in there. This further reinforces their strengths and the tension towards any

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change attempts. For instance, the HIV/AIDS program maintains its own administrative structure and employees working on the information system.

As pointed out earlier, although most of the vertical-reporting systems were harmonized and aligned in the integration initiatives, some of the systems were still running alongside the integrated system. This state of inertia could be explained partly by the perceived results of integration, including fear to lose positions, those with vested interests with the old systems to lose them and the mistrust on the capability of the national HIS in managing and sustaining the integrated system.

The argument as implied from the case is that communication and collaboration between all the necessary stakeholders need to be built and strengthened as a strategy to deal with the inertia of the vertical reporting systems. The national HIS however, need to take a stewardship role to ensure that comprehensive data is obtained from the disparate systems in a cost effective way. This further suggests that some of the vertical systems to run alongside the national HIS, but with the mandate that the national HIS take the driver's seat in ensuring smooth collaboration and communication between the stakeholders. This integration perspective is in line with the concept of accepting to live with a reasonable level of none integration, since no one, including the national health authorities, is in 'control' in any strict sense; and therefore a relevant strategy cannot be based on a planning or control approach.⁸

Hand in hand with the need to strengthen communication linkages, is the need to use gateways to link between the national HIS and the vertical programs information systems which seems strong and hard enough to integrate with the national HIS. Gateways allow the continuous existence of multiple systems, each with their internal organization and logic (ibid). Consequently, gateways can ensure transfer of data from strong multiple vertical systems to the national data warehouse, and therefore make the data available to all stakeholders in a cost effective way. Hence, the use of gateways supports the concept of accepting a certain degree of none integration, while keeping every stakeholder 'happy'.

From the case, the communication and collaboration perspective is exemplified by the approach used by the HMIS Unit in resolving the availability of data collection tools problem. The approach as explained above involved the HMIS Unit summoning all the vertical programs stakeholders in a meeting to collaboratively agree and fund the production of data collection tools. The national HIS using communication and collaboration processes can play the same role to ensure availability of comprehensive data.

The strategy used in Zanzibar of soliciting funds from vertical programs may point to the idea of donors as the main supporters of the health programs to pool resources together as in the case of the Sector Wide Approach (SWAp)²¹, to support the integrated national HIS. However, despite the SWAp policy mandate of strengthening the local capacity to manage funds from donors, evidence shows that countries such as Tanzania is facing difficulties in coordinating the funds using the so called basket fund.²² This is further reinforced by ²⁰, who argues that pooling of resources by the categorical health programs to the integrated HIS is a difficult undertaking. The challenges related with the pooling of resources underline the critical need of the proposed strategy of strengthening communication and collaboration linkages and the need to make use of gateways to ensure flow of information from vertical systems to the national HIS.

6. Conclusion

Integration of HIS in developing countries characterized by multiple vertical programs is quite a challenge. It involves economic and political processes in articulating interests, building alliances and struggling over outcomes.² The tensions between the national HIS which strive for integration and the vertical programs which advocate their information systems supported by donors represent both challenges and opportunities to the integration initiatives. One of the challenges as implied from the study is ensuring compliance of the integrated HIS by the vertical programs in the face of poor economic status of most developing countries. However, as implied from this study, strengthening the collaboration and communication linkages between the national HIS and the vertical programs represent an opportunity to curb the integration challenges. While the paper propose this perspective as a strategy towards HIS integration, more empirical research is needed to find out more how it can be achieved in practice.

The message the paper sends to public health and other practitioners in HIS is that misconstruing or under-estimating the non-technical issues of integration can account for a very significant portion of failures of information systems in healthcare. While technically, the integrated national HIS consisted of datasets catering for the needs of the vertical programs covered by this study, the programs however kept on using their previous systems, presenting challenges to the integration initiatives. Thus, the paper underscore the need to understand the socio economic challenges related to HIS integration which goes beyond technical fixes. The study further reiterates the need to look beyond the integration process, to include the way users receive and engage with the newly integrated HIS.

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