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Major Challenges and Constraint of Integrating Health Information Systems in African Countries: A Namibian Experience

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ABSTRACT

This paper is located within the global debates about integrated Health Information Systems (HIS) in developing countries. From a Namibian experience, this paper examines the major challenges and constrains facing the integration of HIS. The rationale for the examination stems from the notion that the Namibia healthcare is yet to integrate the HIS, despite huge investments and efforts being made on ground. Based on own experience and backed up by a literature review, semi-structured interviews, and participant observation, major challenges and constraint in the integration of HIS and possible solutions are presented and structured. Finally the paper proposes measures within the HIS in the form of annual health provider's workshop that could be implemented in order to share the experiences and lesson learned.

Keywords: *Health Information Systems, integration, challenges, constraint, Namibia*

1. INTRODUCTION

The wide spread use of Information and Communication Technologies (ICTs) has permeated almost all aspects of life including healthcare sector. The intersection between healthcare business process and information systems to deliver better services is popularly known as Health Information Systems (HIS).The use of ICT in healthcare organizations has grown in the same pattern as compared to the large industry landscape. The use of web technology, database management systems and network infrastructure are part of ICT initiative that affects healthcare practice and administration. Its development and implementation in healthcare started in the 1960s and 1970s. The 21st century witnessed a wide range of HIS implementation efforts in both developing and developed countries. Such rapid implementation is facilitated by the nature of healthcare industry of being dynamic. Healthcare industries dynamisms are influenced by economic, social, politics and technologies. Also healthcare is undergoing a paradigm shift, moving from industrial age medicine to information age healthcare (Smith, 1997), as result it is shaping healthcare systems (Haux et al 2002) and transforming the healthcare patient relationship (Ball, 2011)..All these factors forces the countries to adopt HIS to keep improving the services. HIS is sought to be crucial for addressing healthcare challenges and improving healthcare delivery services (abouzer). Deployment of HIS helps healthcare professionals to improve effectiveness, efficiency, and decision making in the healthcare services.

HIS in developing countries have in recent years received significant attention by both healthcare practitioners and the Information Systems (IS) research community. It has mainly promoted from the increasing efforts by governments, international agencies, NGOs and other development partners seeking to improve healthcare services through various interventions and approaches (Nyella, 2011). His is perceived

as a tool for monitoring and evaluation of the interventions, to measure progress towards set out goals and targets. To achieve health for all goal, various developing countries like Namibia, are pursuing an integration strategy for the fragmented systems within the same country. While some countries are managing, some (like Namibia) are still struggling to integrate. Even those developing countries at least managed to join the dance and implement fragmented HIS initiatives, are unable to meet their people's needs. Same applies to Namibia, it has proven difficult to fully implement and reap its benefits. Regardless of different efforts going on and different donors (such as Global fund, United Nations agencies, world bank, etc.) emphases on the importance of HIS integration, little has been done to do so. The Ministry of Health and Social Services has been struggling restlessly to integrate HIS without much success. Most of the contemporary research in HIS integration, focused on the challenges in the process of achieving integration. Many studies have been mainly on the integration of multiple reporting channels within each program such as Malaria, TB, HIV/AIDS, etc. There is a lack of research and studies on integration and increasing fragmentation across the collection of information systems. Therefore, this paper aims to address the major challenges and constraint of integrating Health Information Systems major challenges in the Namibian Healthcare Sector.

The paper is organized as follows. The literature covering HIS is presented. Then, the understanding health sector in Namibia, integration challenges and research methodology followed in the study are set forth. The findings, data analysis and discussion follow. Finally, the paper ends with a conclusion section where implications and contributions of the study are spelt out.

2. HEALTH INFORMATION SYSTEM

Many countries have realized the significance of implementing Health Information System (HIS) in the past few decades.

Many case studies indicated how deploying HIS is very complex task and how it has helped healthcare professionals to improve the efficiency and effectiveness of healthcare services upon successful implementation (Gladwin, Dixon, & Wilson, 2002). This study will prove why MOHSS struggles with adoption of Health Information System due to system integration complexity and also discuss the reasons they should continue striving towards implementation of HIS in Namibian Health Institutions.

The Purpose of MOHSS implementing integrated information systems is as simple and relevant: to contribute to a high quality, efficient patient care. This aim is primarily centered towards the patient and towards medical and nursing care, the administrative and management tasks are then needed to support such care. At current state, a number of Health information systems were developed; implemented and then integrated to enhance opportunities of sharing and exchanging information that will to lead to increase quality and knowledge in our healthcare services.

According to literatures Health information systems are referred to us as relationships between people, process and technology to support operations, management in delivering quality of healthcare services (Hauxet al. (2004); Tan (2002)). (WHO, 2000) Added that a Health Information System is a set of components and procedures organized with the objective of generating information which will improve health care management decisions at all levels of the health system. They are used in healthcare to devise, execute, and measure health interventions which have reliable data and performance of different parts of health system.

HIS is made up of various applications as Person Management, Scheduling, Order Management, Clinical Documentation, Pharmacy Information System, Laboratory Information System, Radiology Information System, and to mention but a fews. These applications consist of infrastructure, organization, workforce and components for the collection, processing, storage, transmission, display, dissemination and disposition of information in the healthcare system (Batya. O. O, 2010). HIS applications are also used by decision makes to generate "current" health status identify potential threats and vulnerabilities in the Health Care Systems (Consulting, 2009).

Many literatures have positive reasoning on use of HIS to support health professions to make uniformed decisions. Miller & Sim (2004) stated that the interest and adoption of HIS in many health institutions and still continuing to be significant. Although a growing number of institutions have successfully implemented and integrated HIS to improve efficiency, it is still unclear whether their results are replicable (Basit Chaudhry et al, 2006).

Rationale of Implementing HIS

Based on HIS conducted in the past highlighted how, health implementation and integrating of HIS is crucial to health service in developing countries. (Joe Rodrigues, 2010) Adoption of HIS in African countries is the greatest potential for improving quality healthcare that offers series of benefit in health care institutions from reducing overall cost, integrated HIS reduce errors and duplication of data and procedures examinations, prescription or referrals, since all health professions have access to all patient records from prescriptions treatment, referrals and so on.

Integration Health Information System helps to improve communication between health professionals and security and confidentiality of patient data and records. By giving health profession access to their summaries data at all-time. As it is believed that health Information is crucial for patient/client management, for health unit management, as well as health system planning and management. This means that not only decision makers and managers need to make use of information in decision making but all care providers, including doctors, health technicians, and community health workers (WHO, 2000).

HIS is a source of knowledge that enables decision-makers at all levels of the health system to recognize progress, problems, needs, make evidence- based decisions on health policies and programs optimally allocate scarce resources all of which are key elements in the success of large scale efforts to achieve health improvements.

Furthermore health institutions need to improve the efficiency and quality of health care delivery through the development and implementation of a standardized and sustainable integrated HIS which will contribute to form national Health Information System. HIS will be equivalent to bringing patient expectation and aligned fashion of IT in actual healthcare services. Here some of the importance identified during the study;

- o **Reduce cost –** integrations of health information helps to reduce cost by eliminating unnecessary duplication of effort at the same time improving healthcare delivery by automating processes so that employees can work more efficiently. Enable system components are able to communicate with all other components and this speed up flow information (Jan Walker et al, 2005).

- o **Encourage information exchange** – implementation of integrated HIS hold the potential to improve the incentives for providers to share information. HIS is believed to increase sharing of information on which treatment work best (Jonathan and Joel, 2007). By providing administration efficiency, although information sharing is not widely use in Namibia health institution

- o **Increase quality healthcare services-** advocate believe electronic recordkeeping of patient and

health worker could improve quality of healthcare (Stephen and Jeffery, 2009). HIS give health practitioner the ability to store and manage their own records securely online; consequently allow patients and doctors to have accessible to have access to medical records. Remotely accessibility of patient medical histories could help facilitate coordination of care among different health care providers. Other HIS advocate also believes that HIS has potential to boost quality in health care by reducing medical errors (Ross Koppel et al, 2005).

o **Reduce errors and redundancy** - HIS interoperability helps to reduce errors and redundancy in medical records. Robert (2008) also argued that HIS that they would reduce redundant medical imaging and laboratory tests. If health practitioner start paying attention.

o **Improve Patient Outcomes** –preliminary evidence form different research assisted in proving how HIS helped healthcare provider to save patient lives. By providing way of communicating between patient and medical doctor, providing better access, elimination of tests/visits repetition. Because sometimes a patient just want to ask for simple question but currently patient has to walk to the doctor. Therefore to ensure that patient outcome is improved Providers need to learn to how the technology effectively.

Challenges

Despite the aforementioned benefits of integrating, adapting and using of HIS in health institutions there are some challenges and issues that are hindering the progress HIS identified during the time of this study. As to mention below;

- **Poor infrastructure**
  For HIS to run it requires technology infrastructure such as software, hardware, and network. It is equally important that the right infrastructure in terms of right sizing, the servers and PCs, with good bandwidth network connectivity and clean power supply will go a long way in ensuring smooth and satisfactory HIS implementation. But these infrastructures may not be available.

- **Inadequate skills**
  There is a lack of knowledgeable personnel with capabilities of integrating and implementing HIS in the health institutions. Literature stated that without required expertise, implementing of HIS is most likely to fail. Due to complexities of HIS integration processes implementation integrated system requires

IT skilled personnel to provide technical support and ongoing training issues and reengineering of system processes in case of business process changes.

- **Lack of training**
  Most of Health organizations merely spend money on HIS without investing in training and redesigning processes to take better advantage of the new technology. Usually these may also cause user resistances if no proper induction was provided.

- **Lack of Stakeholders participation and awareness**
  According to Rogers et al. (2002) stakeholders are all the people or organizations that will be affected by the system and who have a direct or indirect influence on the system requirements. The lack of participation and awareness also leads to unsuccessful introduction of the HIS. This can be attributed to the lack of capacity and training available in the organization but also with the social and cultural issues affecting the organization. This often tends to lead to stakeholders not willing to participate into this process. All stakeholders should be included in the awareness raising and training of the system (Gladwin et al. 2003).

- **Financial resources, Policies and Regulation to integrate HIS**
  Availability of resources in terms of personnel, funding, and infrastructure, so many the laws, regulations, or policies in place for the functioning, sustainability, and political could be one of biggest challenge when implementation of integrated HIS has to take place . HIS systems are very expensive and required training for health professions to make to optimize use of and benefits of HIS, but institutions perceive IT as a low priority area and have only around 2to 3 percent of the total budget for IT. Integrating new system with existing systems makes implementation more complex and increase costs and Heath Institutions may not have enough resources to create affordable and easy to use integrated HIS (Lippeveld, Theo, R. Sauerborn, and C. Bodart, 2000).

- **Lack of standardization**
  Lack of uniformity due to different software programs that are installed, these software programs are incompatible with each other, because of different platform and data format or types. This will make it difficult to adapt to the frequent changes that are experienced in the complex health environment. Therefore lack of standardization leads to poor integration which lead to poor electronic information exchange, therefore users get frustrated as they spend time manually entering data into different systems. (Miller & Sim, 2004) stated that even with wide

adoption, true healthcare transformation will not occur without the standardization and improved interoperability of health care systems.

- **Uniformity of data handling procedures**
  One of the biggest mistakes in an application development setup is to include paper-based information as part of the work process in system. Information written on paper may not be correctly entered into the system. Data may get mixed up during the process of data entry. Although the system gives the facility to allow the nurses to directly enter the data, it is not convenient for them to do so

- **Parallel reporting and lack of coordination**
  Lack of integrated approach; Takes an approach strategically by influencing and educating decision makers through learning process and clear explanations about the advantages and efficiency. This will help them adapt the concepts of higher budget allocation and full computerization and technical integration into the hospital system. According to (Joseph, 2001) there is evidence that top management a failing to realize the importance of applying IT in health institutions. Moreover, there is also a lack of strategy in IT application in health institution

- **Absence of Supportive Supervision**
  Resistance, adaptability and support from the management of institutions still remain a major

concern. Health professional in management positions feel that the use and offer of supervision to support staff with HIS system will take up time for their primary duties (Rodrigues, 2010).

- **Poor use of information**
  Despite the evidence that much of the generated data is irrelevant, of poor quality, redundant, or obsolete, there are nonetheless some useful data sets available.

Method

The source of this data was a questionnaire which comprised of structured questions, using a five-point Likert Scale, where 1=strongly disagree and 5=strongly agree. The questionnaire was developed on the basis of the issues identified through the depth literature review and discussion with the HIS stakeholders. An open ended question to mention any other relevant HIS integration issues was also provided at the end of the questionnaire. Negative statements on the instrument were codified in SPSS to avoid confusion and different interpretation of results.

The population sample for the study was all HIS stakeholders in Namibia. Participants included both public and private hospitals and health clinics. Out of 350 questionnaires sent to the HIS professionals, asking them to respond, 238 questionnaires were returned. The respondents were asked to mark the response which best described their level of agreement with the statement. From 238 questionnaires, 230 were considered useful for analysis, giving a response of 65%

3. RESULTS AND DISCUSSION

The findings of the study identified the challenges; hence different respondents gave their view on HIS, in a form of a table, some respondents disagree, neither agrees or disagrees, strong disagree, agree and strong agree.

Table 1: Major challenges and constraints Presentation and Analysis

Challenges/Constraints	Disagree	Neither agree or disagreed	Strong Disagreed	Agree	Strong Agree
Poor infrastructure	0 (0%)	9(3.91%)	2(0.87%)	57 (24.78%)	162 (70.43%)
Inadequate Skills	2(0.87%)	17(7.39%)	4(1.74%)	101(43.91%)	106(46.09%)
Lack of training	3(1.30%)	17(7.39%)	10(4.35%)	102(44.35%)	98(42.61%)
Lack of Stakeholders participation and awareness	2(0.87%)	17(7.39%)	7(3.04%)	103(44.78%)	101(43.91%)
Financial resources, Policies and Regulation to integrate HIS	2(0.87%)	27(11.74%)	81(35.22%)	74(32.17%)	46(20%)
Lack of Standardization	2(0.87%)	69(30%)	9(3.91%)	80(34.78%)	70(30.43%)
Uniformity of data handling procedures	4(1.74%)	5(2.17%)	19(8.26%)	65(28.26%)	137(59.57%)
Parallel reporting and lack of coordination	4(1.74%)	4(1.74%)	4(1.74%)	50(21.74%)	168(73.04%)
Absence of supportive supervision	5(2.17%)	89(38.69%)	13(5.65%)	73(31.74%)	50(21.74%)
Poor use of information	90(39.13%)	6(2.61%)	24(10.43%)	3(1.30%)	107(46.52%)

Poor infrastructure

The number of respondents who disagreed were 0 and percentages were 0%, those who neither agree or disagreed were 9 and percentages were 3.91%, strong disagreed were 2 and percentages were 0.87%, those who agreed were 57 and percentages were 24.78% while those who strong agreed 162 and percentages were 70.43%, on the HIS to run such as software, hardware and network.

Inadequate Skills

The number of respondents who disagreed were 2 and percentages were 0.87%, those who neither agree or disagreed were 17 and percentages were 7.39%, strong disagreed 4 and percentages were 1.74%, those who agreed were 101 and percentages were 43.91%, those who strong agreed were 106 and percentages were 46.09% on the inadequate skills of integrating and implementing HIS in the health institutions.

Lack of training

The number of respondents who disagreed were 3 and percentages were 1.30%, those who neither agree or disagreed were 17 and percentages were 7.39%, strong disagreed 10 and percentages were 4.35%, those who agreed were 102 and percentages were 44.35%, those who strong agreed were 98 and percentages were 42.61% that most of health organizations merely spend money on HIS without investing in training and redesigning processes to take better advantage of the new technology.

Lack of Stakeholders participation and awareness

The number of respondents who disagreed were 2 and percentages were 0.87%, those who neither agree or disagreed were 17 and percentages were 7.39%, strong disagreed 7 and percentages were 3.04%, those who agreed were 103 and percentages were 44.78%, those who strong agreed were 101 and percentages were 43.91% that lack of participation and awareness leads to unsuccessful introducing of the HIS.

Financial resources, Policies and Regulation to integrate HIS

The number of respondents who disagreed were 2 and percentages were 0.87%, those who neither agree or disagreed were 27 and percentages were 11.74%, strong disagreed 81 and percentages were 35.22%, those who agreed were 74 and percentages were 32.17%, those who strong agreed were 46 and percentages were 20% that HIS systems are very expensive and required training for health professions to make to optimize use of and benefits of HIS.

Lack of Standardization

The number of respondents who disagreed were 2 and percentages were 0.87%, those who neither agree or disagreed

were 69 and percentages were 30%, strong disagreed 9 and percentages were 3.91%, those who agreed were 80 and percentages were 34.78%, those who strong agreed were 70 and percentages were 30.43% that lack of uniformity due to different software programs that are installed; these software programs are incompatible with each other, because of different platform and data format or types.

Uniformity of data handling procedures

The number of respondents who disagreed were 4 and percentages were 1.74%, those who neither agree or disagreed were 5 and percentages were 2.17%, strong disagreed 19 and percentages were 8.26%, those who agreed were 65 and percentages were 28.26%, those who strong agreed were 137 and percentages were 59.57% that one of the biggest mistakes in an application development setup is to include paper-based information as part of the work process in system.

Parallel reporting and lack of coordination

The number of respondents who disagreed were 4 and percentages were 1.74%, those who neither agree or disagreed were 4 and percentages were 1.74%, strong disagreed 4 and percentages were 1.74%, those who agreed were 50 and percentages were 21.74%, those who strong agreed were 168 and percentages were 73.04% that lack of integrated approach; and top management failing to realize the importance of applying IT in health institutions.

Absence of supportive supervision

The number of respondents who disagreed were 5 and percentages were 2.17%, those who neither agree or disagreed were 89 and percentages were 38.69%, strong disagreed 13 and percentages were 5.65%, those who agreed were 73 and percentages were 31.74%, those who strong agreed were 50 and percentages were 21.74% that resistance, adaptability and support from the management of institutions still remain a major concern.

Poor use of information

Large percentage (46.52%) strongly agree that poor use of information is a major challenge in the implementation of HIS in the country. It is followed by 39.13% of respondents who disagree. This different could be facilitated by the lack of skills among the respondents. Those who neither agree or disagreed were 6 and percentages were 2.61%, strong disagreed 24 and percentages were 10.43%, those who agreed were 3 and percentages were 1.30%.

4. CONCLUSION AND RECOMMENDATION

It is evident that, integrated information systems (HIS) remain the main concern in developing countries. From the Namibia point of view, there are major challenges and constrains facing

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the integration of HIS. Namibia healthcare is yet to integrate the HIS, despite huge investments and efforts being made on ground.

Policymakers need to better understand how integrated HIS is diffusing across providers, whether action to branch further adoption is needed, and if so, what steps might be taken. Policymakers should formulate policy to stimulate further investment in HIS integration and HIS training must be implemented to train health professional to gain knowledge and understanding to utilize the HIS in health sectors.

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