

Impact of Enterprise Resource Planning System in Health Care

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Abstract

ERP system in place offers healthcare the opportunity to attract world-class physicians, clinicians, and researchers by providing a very effective and efficient environment. This paper analyses the need for: migration from traditional health operation systems to electronic storage and reporting systems - a full operational electronic web based system as a source of data for Health care and a commitment to the use of health system information in evidence-based management decision making. ERP system in place eliminates duplication and manual processes and proactively increases patient safety through the use of efficient and effective information systems. The aim of this paper is to offer an exploration of ERP in the delivery of healthcare in counties its diverse organizational and regulatory settings, since Counties are an important factor in the current Kenyan devolution economies .This model is applied in an empirical study of a project to introduce a ERP system in Trans Nzoia County health care in Kenya. Both qualitative and quantitative methods will be used to obtain a general understanding of ERP implementation in Health sector

KeyWords: Information Technologies (IT), County, HealthCare, ERP (Enterprise Resource Planning)

1.0 Introduction

Health care is characteristic distinction between activities directed at keeping people healthy and activities directed at restoring health once a disease or injury occurs. Keeping people healthy is the domain of the public health care system and the activities associated with behavioral health. Health care involves activities that work at the population level to keep people healthy: protecting the environment, making sure water supplies and restaurants and food are safe, and providing preventive health services, for example. Behavioral health focuses on helping people make behavioral choices that improve or protect health: for example, not smoking, eating well, exercising, and reducing stress. ERP systems can also be an instrument for transforming functional organizations into process oriented ones. When properly integrated, ERP supports process-oriented businesses effectively (Al-Mashari, 2003).

It is argued that 65% of managers believe ERP project failure will damage a firm. The complexity of ERP, high costs and implementation problems force numerous organizations to reconsider their new plans in relation to this enterprise system (Kumar and Hillegersberg, 2000).

Although ERP applications constitute well – structured, reliable information technology (IT) backbones of fortune 500 companies worldwide (Hofmann,P, 2008). ERP increases effective use in health services, reduces waiting time of patients at Emergency Department and service Work stations and provides better value for purchases at pharmacies by implementing ERP the organization improves the performance of existing business processes, reduces receivable days, credit returns and also improves the back end efficiency. The major suppliers of ERP systems, like SAP and Oracle, strategically consider health care, and especially hospitals, to be a new and growing market. Therefore, special applications, such as patient management, patient logistics, hospital finance and general management, have been developed so that the ERP system fits with the hospital setting. There are a number of reasons why hospitals differ from other industries, and these may have implications for the implementation and use of an ERP in this setting.

First, the *objectives* of hospitals are diverse, since they aim at curing and caring for patients, as well as training and educating new doctors and nurses. Given the diversity of the hospital workforce, the implementation and use of an ERP system requires the cooperation of a large spectrum of professionals, ranging from medical practitioners, such as doctors, nurses and laboratory assistants, to groups that provide non-medical services, such as hospital managers and IT departments. Heeks (2006) suggested that in this context, three different rationalities may collide, namely technical, managerial and medical. Technical rationality is associated with IT professionals and IT suppliers, who share a technical worldview on which they base their system designs.

Managerial rationality applies to hospital managers who operate from legal, financial and control perspective. In its basic definition, ERP is an enterprise-wide information system that integrates and controls all the business processes in the entire organization. According to Nah and Lau (2001) ERP is “a packaged business software system that enables a company to manage the efficient and effective use of resources (materials, human resources, finance, etc.) by providing a total, integrated solution for the organization’s information-processing needs”. This software facilitates, if well-implemented, the integration of all the functional information flows across the organization into a single package with a common database. Therefore, it allows easy and immediate access t information regarding inventory, product or customer data, and prior history information (Shehab *et al.*, 2004).

Physicians need timely access to patient data and information stored in the hospital and clinical information systems. Efficient patient care delivery by physicians and clinicians is a necessity for healthcare organizations. The study shows how the ERP implementation impacts data management, monitory, data retrieval and data storage which enables stakeholders such as physicians and administrators.

ERP have a lot to ponder in terms of managing Medical services or healthcare monitory issues, management impact, costs and in improving the quality of care (Kolodner et al. 2008). By

implementing ERP we provide different ways to reduce patient waiting times, credit returns, improve back-end efficiency. This paper is based upon exploratory research i.e analyzing the historical cases dealt with county hospitals and Pharmaceuticals, where the ERP played their significant role in enhancing their overall efficiency.

In addition to the embedded role of ERP, in clinical and diagnostics equipment, ERP are uniquely positioned to capture, store, process, and communicate timely information to decision makers for better coordination of healthcare at both the individual and population levels. For example, data mining and decision support capabilities can identify potential adverse events for an individual patient while also contributing to the population's health by providing insights into the causes of disease complications. Recent reports highlight the gravity of adverse events in clinics, dispensaries hospitals and the dangers such events pose to individuals and the public (Piontek et al. 2010).

There are a number of reasons why hospitals differ from other industries, and these may have implications for the implementation and use of a ERP in this setting. First, the *objectives* of hospitals are diverse, since they aim at curing and caring for patients, as well as training and educating new doctors and nurses. Research from Glaser reveals that there is the promise is to allow earlier and more precise diagnoses, cheaper and more effective treatments, and minimization of treatment side effects (Glaser et al. 2008). When integrated with electronic medical records (EMR) systems, IS tools can help practitioners use this rich profile data to identify the best candidates for particular interventions in much the same way that marketers use consumer profile data to identify the best prospects Personalized medicine means using knowledge about an individual's unique physiological makeup and medical history to tailor medical care most appropriately to that individual. Question is whether the use of ERP being an information processing Hub, can help counties to cope with new challenges in health care sector (Clinics, Dispensaries and Hospitals).

ERP solution could arise out of the need to quickly add functionality to critical IT applications based on local health care Registry operators, Check roll operators, Nurses and Doctors .Executives are under great pressure to make their organizations more agile with use of technology. Part of the pressure comes from local business units taking at face value expectations that often accompany new technology investments, including claims that technology will enable them to get things done faster, easier, cheaper, and better. As a result, local business units put pressure on their IT groups to draw on the most recent technology to quickly develop new products and services specific to their customers in a particular sector and geographic area.

Heeks (2006: 12) argues that 'hard design' often conflicts with 'soft design'. Hard design can be characterised by a top-down approach, with formalized communication. With Trans Nzoia County in Kenya we concentrate our analysis in a region where marginalisation in terms of world markets is especially prevalent. Besides, the salencies of Kenya's counties (e.g., relatively small size and young age by international comparisons, human capital stock and profile, levels of investments in new technologies, etc.) are drawn into the analysis. We assume that these specific characteristics impact the implementation and use of ERP systems. Differences in the nature of the processes may have implications for the implementation and use of IS within a hospital context.

1.2 NEED FOR ERP TO RUN HEALTH CARE

Individuals trust nonprofit hospitals with electronic health systems to a much higher extent than they trust government and for-profit organizations, which might give advocates of government-sponsored single-payer systems some pause. Organizations are continuously learning how to use technology to operate and innovate more effectively and efficiently Khalil, T., and Sleit, A. (2012) .Digitization of health information has several benefits. However, the research of Anderson and Agarwal underscores the need to understand the situational factors that drive individuals' comfort with sharing healthcare information in an electronic format. One implication of this research for policy makers is to explore more stringent regulation of medical information, for example, to require that stakeholders clearly identify who they are, for what purpose they will use the data, and even to set limits on the amount of time that the stakeholder will have access.

Several implications for implementation and adoption of healthcare IS arise from Oborn *et al.* For example, usage patterns are complex and entangled; therefore, it is highly simplistic to classify usage as use and nonuse (or rejection). Most individuals involved in patient care have a variety of relationships with others involved in the care of the same set of patients, and these relationships vary across practices and individuals. For example, nurses perceived technology as depersonalizing the patient-nurse relationship and, hence, continued to use their paper records, which provided added flexibility to record important personal information. Nurses' nonuse was not driven either by their rejection of the technology or by their lack of familiarity with it; nurses understood the technology, supported surgeons in their patient. The quality and efficiency of healthcare delivery is heavily dependent on the efficacy of the daily routines for creating, accessing, modifying, and using these documents, and so the shift from paper-based to system based charts is a high-stakes endeavor.

2.0 LITERATURE REVIEW

2.1 ERP SYSTEM CRITICAL IMPLEMENTATION FACTORS

Several authors have examined the "prerequisites" for a successful ERP project (Umble and Umble 2002; Barker and Frolich 2003; Stapleton and Rezak 2004; Plant and Willcocks 2007). Muscatello and Chen (2008) completed an extensive review of both scholarly and practitioner literature which yielded factors such as, we adopt the same factors in implementing the ERP:

Strategic initiatives: Managers in health sector need to articulate clearly how an ERP system will assist in implementing organizational strategy. Framing the matter in terms of Porter's **value chain** (1985), ERP systems can enhance a firm's ability to compete in at least the following ways: o **Infrastructure:** The ERP system provides comprehensive, integrated data for managing enterprise value creation.

Human resource management: People are an organization's most important asset, though they do not appear on any financial statement as such. The ERP system can assist in managing virtually every major HR related task, including hiring and recruitment, training and compensation, benefits management and retirement.

Training and testing: Training and testing of the system should be done properly by the ERP Consultants, that is, the vendor is provided as part of the implementation procedure to only

a 30% group of people from the clients' side known as the Core Team. This core team in turn trains a rest of people who are actually responsible for day-to-day transactions called the End Users. It was observed that the 50% second leg of training which is provided to the end users was not carried out mainly due to lack of computer literacy, not will to accept the responsibility this triggered a strong resistance to change for the new system being installed and caused reduction in employee motivation.

Expectations from the ERP System: Clarity in management objectives and expectations from the ERP System are clearly stated to the vendors. This led to a belief of the systems' power to integrate the company actual functions. According to the vendor, management expected a quick return on investment which was not practical since it takes around three to four months to notice any significant returns. Hence, top management should be patient with the new system and any fear of failure should be done with for a successful running system.

Employee Retention: There is need after the completion of ERP training provided to the staff and within some days of the system going live, many of the trainees from the Organization quit the company causing great losses to organization in the form of shortage of key resources i.e. trained staff. This was a big percentage of employee attrition rate and it is not possible for a company to hold back any of its employees even with the most stringent contract.

Design & Testing: is a very important part of software testing and should not be neglected the computer work stations are set up in a room to represent each of the major tasks of customer service /order entry, planning, goods-in, stores and finance. A simplified data set is loaded and the company operations run through. The data is gradually increased as first the project team, then managers and finally users get more familiar with the software. This is conducted just before the ERP becomes fully functional in the organization.

Customization should be less than 30%- Customization Services involves any modifications or extensions that change how the out-of-the-box ERP system works. Customizing an ERP package can be very expensive and complicated. Some ERP packages have very generic features, such that customization occurs in most implementations. Customization work is usually undertaken as "changes requested beforehand" software development on a time and materials basis. But ideally, experts in the ERP implementation field have suggested that customization should be less than 30%.

2.2 CHALLENGES TO ERP SYSTEM IMPLEMENTATION

According to Kroenke (2008), the process of moving from functional applications to an ERP system is difficult and challenging .Additionally, the switch to ERP system is expensive and it requires development of new procedures, training and converting data (Zhang *et al.*, 2005). while the E-healthcare system in their study has a positive effect on quality of care overall, in-group ties among doctors and out-group ties to doctors has a negative effect on system use for all groups, indicating that doctors likely hamper the spread of technology. Given the diversity of the hospital workforce, the implementation and use of an ERP System requires the cooperation of a large spectrum of professionals, ranging from medical practitioners, such

as doctors, nurses and laboratory assistants, to groups that provide non-medical services, such as hospital managers and IT departments.

Heeks (2006) suggested that in this context, three different rationalities may collide, namely technical, managerial and medical. Technical rationality is associated with IT professionals and IT suppliers, who share a technical worldview on which they base their system designs. Physicians' rejection of technology is a serious problem that can lead to poor quality of care, medical errors, and low patient satisfaction. When we add mistrusting patients (Anderson and Agarwal) and non sharing providers (Bandyopadhyay et al., in this issue) to the problem of doctors who not only make inadequate use of technology but also adversely influence others' usage of technology, the situation is compounded and likely results in errors (Aron et al.) and potentially serious public health consequences (Chen et al.).

Using archival data they examine the efficiency and quality effects of IS avoidance at three levels: the individual user level (physician), the shared group level healthcare team, including paraprofessionals and administrators and the configurational. Research shows that nearly 83.33% of companies from Indonesia (Dantes and Hasibaun, 2011), 50%-75% of US firms (Hawari and Heeks, 2010), ~ 90% China firms failed in ERP implementations, majorly include FoxMeyer Drugs, Applied Materials, Hershey, Mobil Europe, and Dow Chemicals.

Differences in the nature of the processes may have implications for the implementation and use of IS within a hospital context. Heeks (2006: 127) argues that 'hard design' often conflicts with 'soft design'. Hard design can be characterised by a top-down approach, with formalised communication flows and a 'big bang' implementation. Soft design, on the other hand, is more informal and involves a rather loose 'muddling through' approach.

Heeks suggests that implementation failures are more likely when a highly structured and formal information system is introduced into a loosely coupled and complicated reality. Given the diversity of the hospital workforce, the implementation and use of an ERP system requires the cooperation of a large spectrum of professionals, ranging from medical practitioners, such as doctors, nurses and laboratory assistants, to groups that provide non-medical services, such as hospital managers and IT departments.

Heeks (2006) suggested that in this context, three different rationalities may collide, namely technical, managerial and medical. Technical rationality is associated with IT professionals and IT suppliers, who share a technical worldview on which they base their system designs.

2.3 FACTORS AFFECTING ERP IMPLEMENTATION NEED FOR ERP SYSTEM IMPLEMENTATION

The integration of ERP in healthcare is needed to support issues such as: Clinical and administrative tasks, Better healthcare, Patients' data security, Interoperability, Healthcare process integration, and Utilisation of valuable legacy systems and new technologies. In addition, ERP can provide numerous benefits to health care organization. Human resource can benefit from a ERP implementation due to centralized scheduling. In addition, billing, laboratory, pharmacy and patient records can help in the anticipation of internal workflow (Jenkins and Christenson, 2001).

Technology is propelling the world-wide advancement of health care offering the greatest opportunity to implement best practices, utilize evidence-based medicine, reduce human error, improve efficiency, compile comprehensive health data sources, and provide minimally invasive care tools. It removes access to expertise barriers through tele-health and telemedicine. ERP systems can rapidly convert from analog to digital distribution of information. In the future, all information and communication will convert to digital format in which the Internet will link millions of providers, services, and settings link seamless web of care.

Special applications, such as patient management, patient logistics, hospital finance and general management, have been developed so that the ERP system fits with the hospital setting. There are a number of reasons why hospitals differ from other industries, and these may have implications for the implementation and use of an ERP like any other needs of hospitals are diverse, they aim at curing and caring for patients, as well as training and educating new doctors and nurses. Its true that the hospital *processes* are different in that they are highly varied and more complicated than processes in many other industries (Arrow, 1963).

The *workforce* of hospitals is diverse and includes a large spectrum of professionals that can be characterised by possessing expertise, power and autonomy (Johnson, 1972; Scott, 1982; Mintzberg, 1983; Raelin, 1991; Yi *et al.*, 2006). We assume that these specific characteristics impact the implementation and use of ERP systems. Differences in the nature of the processes may have implications for the implementation and use of IS within a hospital context. Heeks (2006: 127) argues that 'hard design' often conflicts with 'soft design'. Hard design can be characterised by a top-down approach, with formalised communication flows and a 'big bang' implementation. Soft design, on the other hand, is more informal and involves a rather loose 'muddling through' approach.

ERP is designed to operate the entire healthcare functionalities and all related activities including finance, materials management, human resources, and decision support. ERP (i.e. Enterprise Resource Planning) is a derivative of "Manufacturing Resource Planning", which has become an old term because industry professionals were not being successful with it due to the limitations of the software tools which existed at that time. Healthcare in counties will have the ability to transform how care is offered, such in the future will become a global industry, competitive, where patients will utilize the best service medically, practitioners and facilities in the world. With the transformation into an ERP system, a healthcare organization has the opportunity; perform in terms of service delivery.

2.4 ERP BENEFITS TO HEALTH CARE

The ERP provides an effective solution to hospitals that plan to reduce the costs of administrative and clinical transactions, and at the same time, provide better service to their consumers. It aids hospital administrators by significantly improving operational control and streamlining operations. It enables improved response to demands of patient care because it automates the process of collecting; collating and retrieving patient information. Clinical pathways mapped to the system improve diagnoses and treatments offered. It provides doctors and hospital staff with the decision support system that they require for delivering patient care, which is comparable to global standards .By enabling an automated and

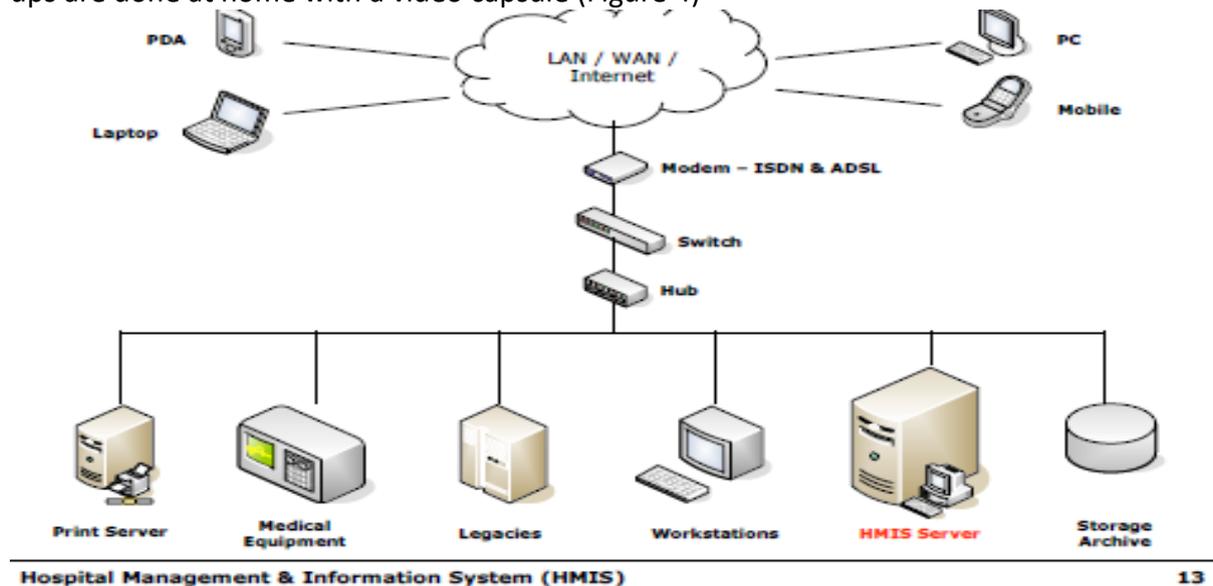
intelligent flow of patient information, the ERP enables hospitals and doctors to better serve their patients

Additionally, the ERP provides a host of direct benefits such as easier patient record Management, reduced paperwork, faster information flow between various departments, greater organizational flexibility, reliable and timely information, minimal inventory levels, reduced wastage, reduced waiting time at the counters for patients and reduced registration time for patients. The indirect benefits would be an improved image of the hospital and increased competitive advantage. The System not only provides an opportunity to the hospital to enhance their patient care but can also increase the profitability of the organization

2.5 SUCCESSFUL ERP SYSTEM

ERP system, a healthcare organization has the opportunity to: Attract world-class physicians, clinicians, and researchers by providing a very effective and efficient environment. Basically improve the quality of care for patients, With the ERP system successfully in place, it will be Center of Excellence and healthcare destination of choice, it will transform how medical care is delivered. ERP system will Streamline care delivery, eliminating duplicate and manual processes and proactively increase patient safety through the use of efficient and effective information systems

Inpatient length of stay may drop substantially due the utilization of a ERP system. The efficiency of invasive technology has reduced open surgery to camera and robot assisted surgery decreasing complications and speeding recovery time. Outpatient care is growing at more than twice the rate of inpatient care due to advanced technologies that facilitate minimally invasive surgery and home monitoring technology. Terminal tumors are being treated by laser intervention requiring only an outpatient stay. Endoscopic diagnostic work-ups are done at home with a video capsule (Figure 4)



The goal of companies within counties is to standardize, automate and integrate systems and data As put by McDonald, “Our goal is to standardize, automate and integrate systems and data so we can create a real-time operating and decision-making environment. We want

counties be the most technology-enabled government in the world.” (Source: Annual Report 2010).

Pettigrew (1973; 1985; 1988) argued that organizational change can be understood by considering the interactions between the content, context and process of change within the organization. The implementation of change is an ‘iterative, cumulative, and reformulation-in-use process. Successful change is a result of the interaction between the content or ‘what’ of change, the process or ‘how’ of change (implementation), and the organizational context or ‘where’ of change (the internal and external environment). He also suggested that the change agent must be willing to intervene in the political systems of the organization, and to legitimate the change in spite of competing proposals and ideas.

ERP system requires the cooperation of a large spectrum of professionals, ranging from medical practitioners, such as doctors, nurses and laboratory assistants, to groups that provide non-medical services, such as hospital managers and IT departments. Heeks (2006). Some of the best-known success stories come from genetics-driven personalization, such as Herceptin, a monoclonal antibody treatment that can be quite effective—but just for women with a particularly aggressive form of breast cancer. Another example is warfarin, a coagulant that can now be more precisely dosed based on certain gene variations that affect individuals’ drug metabolism, thereby avoiding thousands of cases per year of serious bleeding and strokes (Aspinall and Hamermesh 2007). Managerial rationality applies to hospital managers who operate from legal, financial and control perspectives. Medical rationality typically refers to physicians, who prefer to put medical information and patients at the centre of the system.

Heeks (2006) argued that a collision of rationalities may easily lead to implementation and usage failure. Since ERP systems are particularly directed at increasing the controllability of hospital processes by means of integration and standardization, they can be considered examples of managerial rationality. This managerial rationality may collide with some of the other rationalities. Recent reports highlight the gravity of adverse events in hospitals and the dangers such events pose to individuals and the public (Piontek et al. 2010). Healthcare mistakes have serious consequences that can affect our ability to carry out social and productive endeavors. More generally, medical errors (a leading cause of adverse events and other ills) are expensive, increase patient hospital length of stay, and cost human lives (Classen et al. 1997). When potential healthcare risks extend to the larger population, the demand for resources increases, as do the consequences of improper resource deployment. Many lives are at risk during outbreaks of infectious diseases, such as severe acute respiratory syndrome.

2.6 WORLD COMPARISON ERP IMPLEMENTATIONS ON ICT AND HEALTH CARE

2.6.1 ERP PERFORMANCE IN HEALTH CARE IN INDIA

In India the potential healthcare industry is a major one in service sector with USD 40 Billion revenues by constituting 5% of GDP and is offering employment to around 4 million people. As per the World health Organization (WHO) 2010 report, private sector is spending more in healthcare than public sector. One way this indicates that healthcare is growing enormously.

The major driving factors for the growth of healthcare industry are demographic and Economic factors. These have brought dramatic improvements in the processes performed by the companies in Healthcare industry. Studies emphasise that there are several organizations those got benefited by reengineering their business processes at National and International level such as Indraprastha Apollo Hospital, GCR hospital, Singapore hospital in surgical work, Geneva pharmaceuticals and so on.

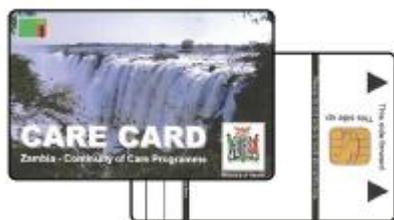
It was found that Information Technology (IT) is used as a tool in better performing Business Process Reengineering Enterprise Resource Planning (ERP) is the latest solution the IT has provided for improving the efficiency of business processes. The ERP implementation has several tangible and intangible benefits reported by Deloitte consulting. Therefore, ERP systems software has spread its wings across all industries. This paper analysed certain examples of healthcare industry those got benefited using ERP such as Geneva pharmaceuticals, Siriraj university hospital, Wockhardt, Piedmont healthcare management group, and Pharma Co. But there are certain points come to the mind, when it comes to the ERP implementation.

2.6.2 ZAMBIA SMARTCARE SYSTEM TO REDUCE USE OF PAPERWORK ON HEALTH CLINIC STAFF

SmartCare has aimed to enable electronic data entry of patient health information so that health facility staff does not have to manually collect and aggregate data. The system allows three modes of data entry: “e-first” is entry of client data as the client is cared for; “e-fast” is entry after a client consultation, but before the client leaves the health facility; and “elast” is entry after the client leaves the health facility *Greater continuity of care*. SmartCare aims to improve continuity of care by building a complete patient health record SmartCare “modules,” or areas of care. After a consultation, a health care professional or data entry associate uses a touch screen to enter patient data into the health facility’s distributed database. The patient’s health data is then saved in the database and on the patient’s SmartCard. The system can synchronize health records on a monthly or periodic basis via flash drive, across all facilities that the patient has visited. This provides reconciliation of patient records in the absence of the SmartCard (for example, if the card were lost). The end-goal is to ensure that each patient has a complete, up-to-date, and confidential health record for each visit to a health facility. All patient health information is transitioned from paper files to the SmartCare database and the SmartCard. The SmartCare databases are governed by role-based security protocols that bar those who are not care providers from accessing patient health records. Data merges between health facilities are limited to records for patients who had visited both facilities

At the health facility, the Smart Care package includes Smart Cards (Figure 3) a SmartCard reader; a desktop computer equipped with a touch-screen and the SmartCare software; a printer; an uninterrupted power supply (UPS) battery back-up; a power strip; and a flash drive

for transporting data to the health district or other health facilities.



Source: **Zambia SmartCard**

2.6.3 ERP INVESTMENT IN USA ON HEALT CARE

The United States spends an estimated \$2 trillion annually on healthcare expenses which represents more than 17 percent of its GDP in 2009, U.S. 4 April 2011). Further exponential growth is expected as the healthcare industry implements electronic medical records upgrading Health Information Management Systems (HIMS) into a Total Healthcare Enterprise Resource Planning System (THERP) and setting up intranets for sharing information and providing remote diagnostics via telemedicine.

The provision of high-quality health cares in the United States and globally will improve financial , technical, The cost to the U.S. economy is expected to double by 2015, approaching 20% of GDP (Borger et al., 2008). Research show that the use of IT by physicians resulted in changes and hospital costs that were 13% lower per admission than those generated by physicians in a control group , 21st Century (2001). Also, 44% of the physicians who participated in the study felt that using the system for direct order entry helped them to perform their clinical work faster and 52% felt that the system made their work easier , Anderson J. (1997).

Health plans are experiencing a period of financial prosperity. This reflects the industries shift in focus from enrollment growth to overall earnings growth, as well as health plans' ability to effectively price ahead of actual claims in recent years. The industry was also boosted by expansion of new U.S. markets, such as Medicare with the passage of the Medicare Prescription Drug, Improvement and Modernization Act (MMA) of 2003.10 Investors have welcomed and rewarded these changes (see Figure 1). looking forward, u.s. healthcare expenditures are forecasted to increase from US\$2.26 trillion (US\$7,498 per capita) in 2007, to US\$4.14 trillion in 2016 (US\$12,782 per capita, 6.9 percent annual growth).11 While this will seemingly offer health plans new opportunities, it will also pose new challenges.

FIGURE 1.

Investors have rewarded health plans for their recent earnings growth.



Note: "Healthcare payer index" refers to Morgan Stanley's "Healthcare Payors Index" ("HMO").
Source: Yahoo! Finance, January 1997 through July 2007.

2.7 HEALTH CARE MANAGEMENT

Heeks (2006) argued that a collision of rationalities may easily lead to implementation and usage failure. Managerial rationality applies to hospital managers who operate from legal, financial and control perspectives. Medical rationality typically refers to physicians, who prefer to put medical information and patients at the centre of the system. Since systems are particularly directed at increasing the controllability of hospital processes by means of integration and standardization, they can be considered examples of managerial rationality.

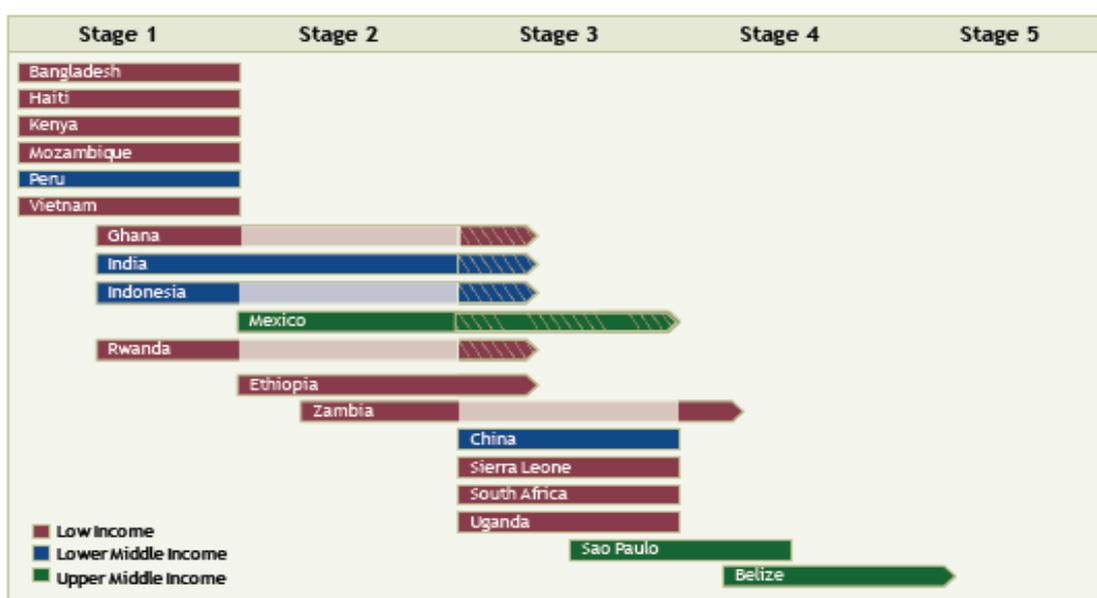
Bennis (1984) suggested that management of change is actually 'management of meaning', and therefore involves an attempt to: (1) convince others of the credibility and legitimacy of particular problem definitions and solutions; and (2) gain consent and compliance (Boddy, 2002). This managerial rationality may collide with some of the other rationalities. Pettigrew (1973; 1985; 1988) argued that organizational change can be understood by considering the interactions between the content, context and process of change within the organisation. The implementation of change is an 'iterative, cumulative, and reformulation-in-use process' (Pettigrew, 1988: 63). Successful change is a result of the interaction between the content or 'what' of change, the process or 'how' of change (implementation), and the organisational context or 'where' of change (the internal and external environment). He also suggested that the change agent must be willing to intervene in the political systems of the organisation, and to legitimate the change in spite of competing proposals and ideas.

The county leaders need a ICT engagement model, the model is defined as a system of governance mechanisms bringing together key stakeholders to ensure that projects achieve both firm-wide and local. An ICT engagement model consists of the following three general components: County -wide ICT Governance: Decision rights and accountability of County -level stakeholders and business unit-level stakeholders to define firm wide objectives and encourage desirable behavior in the use of technology.

Project Management in Counties: Formalized project management processes, with clear deliverables and regular well-defined checkpoints that encourage disciplined, predictable

behavior for project teams. Linking Mechanisms: Processes and decision-making bodies that connect project-level activities to the overall ICT governance. ERP allows easy and immediate access to information regarding inventory, product or customer data, and prior history information (Shehab *et al.*, 2004). ERP initially covered all routine transactions within an organization only. However, it was later expanded to cover external customers and suppliers (Turban *et al.*, 2006). Nah and Lau (2001) stated that most ERP systems now have the functionality and the capability to facilitate the flow of information across all business processes internally and externally. Furthermore, ERP systems have the capability to “reach beyond their own corporate walls to better connect with suppliers, distributors and customers to engage in e-business.

Countries Characterized By the Usage of Paper Based And Electronic Systems



Source: Vital Wave Consulting HIS 2009

Stage 1 is characterized by the usage of paper-based systems for collecting health Data indicators. The second Stage is characterized by as optimization of paper systems through simplifying indicators and reducing duplication. The third Stage is identified by a migration of traditional health information systems to electronic storage and reporting. The fourth stage is characterized by the introduction of operational IT systems as a source of data for the system. The fifth Stage represents the achievement of an end state of a fully comprehensive and integrated national HIS.

Vietnam

Belize

3.0 RESEARCH METHODOLOGY

We took a qualitative, multiple case study approach. In our view, this was the most suitable method for dealing with the issue of ERP implementation in hospitals. The research questions were exploratory (Yin, 1999; Dubé and Paré, 2003) and aimed at identifying the stakeholders, the meaning they attached to the system, and the methods they used to either promote or inhibit implementation.

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