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A Theoretical Review of Integration of Managed Equipment Services and Delivery of Healthcare Services

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Abstract: ***Healthcare is a critical component in the growth and management of any economy. Improved health will translate into increased productivity, educational performance, life expectancy, increased investment and savings, decreased expenditure in healthcare and debt leading to greater economic growth and equity, social and political stability. The world is losing millions of children to preventable diseases because of inequalities in health and development and these problems are worst where resources are least available to those who need more care and have the least access. Implementation of MES has been known to create competitive advantage to hospitals who can focus on their core services. This leads to increased efficiency, effectiveness and low costs. Each innovation of medical equipment brings rise in capability and performance of health facility. However, demand in health care services lead to changes in medical equipment. These changes come at a greater cost since medical equipment tend to be short lived. Achieving great equipment efficiency requires knowledge about the product brand design, weakness, operational efficiency and other technical aspects. In this respect, this study aims to perform a MES SWOT analysis. This analysis will assist in identifying the organizations benefits, weaknesses, risks and opportunities for MES strategy formulation.***

Keywords: Managed Equipment Services (MES), Integration, Strengths, Weaknesses, Opportunities and Threats (SWOT)

1. Introduction

Healthcare is a critical component in the growth and management of any economy. Improved health will translate into increased productivity, educational performance, life expectancy, increased investment and savings, decreased expenditure in healthcare and debt. This will ultimately lead to greater economic growth and equity, social and political stability. Healthcare is therefore a key factor in human development [3].

The government of Kenya has recognized this and made healthcare as one of the components in the social pillars [10]. Healthcare has also been devolved in the dispensation of the new constitution to reach closer to the people. According to the Vision, both national and county governments are to provide equitable and affordable health care and at the highest affordable standard to the citizens. Good health is expected to play an important role in boosting economic growth, poverty reduction and realization of social goals.

For this to be achieved the government has put in place several measures ranging from accessibility which includes geographical access, Financial access and management of socio-cultural barriers. This takes care of affordability, availability of services and accessibility. Equity is another critical area of focus which addresses regional disparities, socio-economic factors, gender and vulnerable groups and physically challenged. The other area of focus is capacity which is focuses on service delivery systems, healthcare inputs, partnerships, healthcare financing and research. There is also emphasis on institutional framework which deals with healthcare policy, integration, incentive structure and stakeholders' involvement and collaboration.

This focus is apparent due to the disparities witnessed over years. According to [3] universally, more advances in health, science, and technology have been made in the last 50 years than in the 500 years before the 20th Century [17]. Health infrastructure has been expanded and education, incomes, and opportunities have improved. Public health interventions and socioeconomic development have reduced mortality and raised life expectancy. Unfortunately, these gains have by no means been universal. The health gaps within and between countries have widened, perhaps due to inequality in the absorption of new technology as well as unequal distribution of new and re-emerging health problems [17].

1.1 What is MES?

A Managed Equipment Service is an adaptable and specific partnership with a private sector specialist organization to provide medical equipment throughout contract period of 10-25 years at an annual fee. This service package entails ownership, acquisition, installation and commissioning, user training, asset management, maintenance and ongoing replacement medical technology and equipment. MES scope covers Medical technology, consulting services, financing options, user training, and Maintenance services [15]

1.2 Need for MES Integration in Health Care

Health institutions in effort enhance nature of care regularly concentrate on a solitary or interventionary solutions on a single process. Albeit significant, this approach is incremental, an organization may miss out on the real opportunities to set the foundation for better health care delivery. It appears that systems integration by networking computers, medical equipment, software and other hardware technologies is necessary for health institutions to move to the next level of health care service delivery.

Systems integration joins the key building blocks of man power, innovation (software and hardware innovations), data, information, feedback and standard operating procedures to enhance quality in health services delivery. Stand-alone medical systems have been known encounter diagnostic errors, failures to report on patient conditions, communication breakdowns and inefficiency. These characteristics lead to medical staff work burn out and stress [2].

Medical equipment integration requires team effort of healthcare practitioners, health institutions administrators, researchers, systems designers and engineers as well as industry players including vendors, consultants and government agencies. For instance, integration technique has been applied by 98 Kenyan hospitals in an effort to offer better healthcare through innovative ideas like MES. Although 100% implementation has not been achieved, due to conflict of interest from individuals within and outside public health institutions. For success to be realized, conflicting interest must be managed.

1.3 Statement of the Problem

The world is losing more than 11 million children to preventable diseases as a result of inequalities in health and development and these problems are worst where resources are least available to those who need more care and have the least access [7]. Implementation of MES has been known to create competitive advantage to hospitals who can focus on their core services. This leads to increased efficiency, effectiveness and low costs.

Each innovation of medical equipment brings rise in capability and performance of any health facility. However, demand in health care services lead to changes in medical equipment. These changes come at a greater cost since medical equipment tend to be short lived. Achieving great equipment efficiency requires knowledge about the product brand design, weakness, operational efficiency and other technical aspects.

The threat of environmental, human, technological and organizational factors endangers the operations of hospitals [12]. In this respect, this study aims to perform a MES SWOT analysis. This analysis will assist in identifying the organizations benefits, weaknesses, risks and opportunities for MES strategy formulation.

1.4 General objective of the study

The general objective of this study is to review literature on the integration of Managed equipment services and healthcare service delivery.

1.5 Specific Objectives of the study

1) To establish the factors that may influence MES integration in healthcare delivery
2) To find out the characteristics of organizations that make them integrate MES and
3) To determine the consequences to the organization on adopting integration of MES in healthcare service delivery.

2. Theoretical Framework

2.1 Diffusion of Innovations Theory (DOI)

Diffusion is the "process by which an innovation is communicated through certain channels over a period among the members of a social system". An innovation is "an idea, practice, or object that is perceived to be new by an individual or other unit of adoption". "Communication is a process in which participants create and share information with one another to reach a mutual understanding" [5].

The basic thought of DOI focuses on the conditions which improve or diminish the probability that another thought, item, or practice will be adopted by individuals from a given social framework. Diffusion of Innovations model theorizes that media and additionally interpersonal contacts give information and impact sentiment and judgment. In describing studies of diffusions of innovations, [5] proposed four parts: the development or innovation, diffusion (or dissemination) through the social framework, time and outcomes.

Information flows through systems. The way of the social connections and correspondence designs inside and between systems are persuasive similar to the parts supposition pioneers, change specialists and champions. Supposition pioneers can decide the probability that an innovation or new care practice will be embraced by endorsing and promoting it. Opinion leaders, change operators and champions apply pressure on others in the social framework and their conduct through their personal contact. Five adopter classifications are innovators, early adopters, early majority, late majority, and laggards.

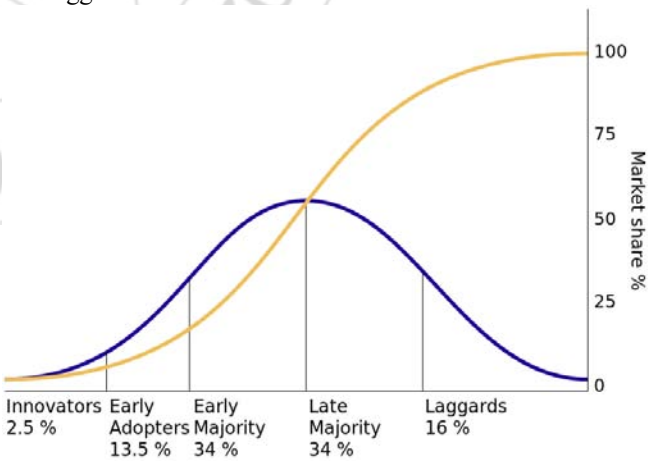

Figure 1: Adopter categories
Source: [5]

These adopter kinds are regularly circulated proposing that there are a few of trend-setters and a couple of laggards, and the greater part are early or late adopters, who can be successfully convinced if the innovation characteristics are ideal (relative advantage, compatibility, complexity, trialability, observability).

The strengths of the model include 1) the ability to determine potential barriers and facilitators in the evaluation, perception, and adoption of new ideas or care practices, 2) the ability to view a planned change effort through a holistic perspective that takes into consideration the importance and influence of the individual, system, and communication patterns within the system and the characteristics of the innovation, 3) the framework relates to other conceptual models of change and social science and behaviour theories, but is constituted into a coherent model that can be used easily and effectively in practice for developing strategic initiatives that are empirically and theoretically based, and 4) it has had successful widespread use across different disciplines and there are a simple set of core ideas that are easily conveyed, thus making the model practical, relevant, and useful in research.

3. Discussion

3.1 Managed Equipment Services SWOT Analysis

Medical equipment are fundamental to the delivery of quality healthcare services and represent a huge extent of the aggregate resource base of individual health services. The management of medical equipment is one of the risk-critical issues to keep healthcare services in light of the fact that the inaccessibility of equipment presents a danger to patients, staff and service delivery. The risks, weaknesses, opportunities as well as the benefits need to be managed efficiently and effectively.

3.2 Benefits of MES Integration

According to [20] Nations around the globe are moving from purchasing medical technological equipment and consumables to service models using intermediaries known as called managed equipment and multivendor service integrators. These intermediaries can purchase, run, maintain and finance all medical equipment. [21] reports that an MES entails many components that include the maintenance, replacement, repair, procurement, delivery, installation, and clinical commissioning of medical technology. MES can also feature professional consulting services such as process improvement, asset management, and vendor management.

The inventive financing model permits nations to budget healthcare consumption over a long period by conceding forthright capital costs. Additionally, this venture enables governments through ministries of health to provide better health services to their citizens. This guarantees that even the individuals who can't meet the cost of health care gain access to them as basic human right.

An investment in MES provides health institutions with the following benefits; Avoidance of technology obsolescence, guarantee access to innovation and extensive resource administration, access to customized financial solutions, provision of long term spending plan and capital planning certainty, operationalize and streamlined long-term purchasing mechanics and management, provision of reassurance to clinical staff that access to the latest clinical capabilities will continue [19] The relative competitive advantage construct of the DOI model underpins this suggestion.

CGI (2014) presents other benefits focusing on the patient, the clinical staff and the financial benefits. The patient has access to modern equipment that improves treatment and safety, the waiting times is improved, the processes are swifter and there is reduced risks through continuous training of staff and the original equipment take upon themselves to have the users training.

Clinical staff have access to up-to-date good equipment. The downtimes are greatly reduced which leads to services reliability and improved working environment. The staff also focus on their primary work of improved patient care without thinking about the status of the equipment. According to CGI (2014), up to 10% capital savings are realized through MES, operational saving of between 10% to 15% are realized. The risks are transferred from the hospitals to the MES service providers and this enables long-term budget planning and stability of the institution. The equipment uptime is guaranteed through MES and the working capital is well protected.

3.3 Weaknesses of MES Integration

Frost and Sullivan [18] posit that the fragmented nature of healthcare industry and internal hospital structures inhibit productive and institutionalized care. In majority of healthcare institutions, patient history, imaging scans, and different tests are all stored under different applications, making it difficult for specialists to pick up a full patient view for a proper diagnosis. Notwithstanding this divided information structure, since budgetary assets have been given to updating existing equipment and applications, many health care institutions medical equipment become obsolete thus limiting medical practitioners for gaining access of tests results for diagnosis and treatment. Additionally, since budgetary allocations and spending plans have encountered such huge pressure, most health facilities cannot bolster expanded spending on extra administrative personnel to seek after more proficient strategies for acquisition, maintenance, and care institutionalization.

In Canada, every year in healthcare institutions, teams of senior executives make arrangements of hardware needing replacement. Because of budget limitations, they slice those rundowns and prioritize where the available resources will be utilized. For the equipment not upgraded, cash must be allotted to upgrade and service it. Frequently long past its expected work life. This frustrates members of staff in delivering quality healthcare [22].

3.4 Threats to MES Integration

Critical health challenges and fast-emerging computer-based innovations are provoking a worldwide reconsideration of how healthcare is organized and conveyed. Healthcare practitioners understand the requirement for an integrated way to deal with healthcare that amplifies proficiency, enhances patient understanding and encourages a healthier

populace.

MES integration involves various challenges including lack of coverage for equipment procured outside the MES (private or departmental), an absence of home healthcare equipment maintenance, and difficulty retaining high-quality clinical engineers [18]

In some most cases, majority of healthcare technology management practitioners hold on to the view that healthcare institutions are best served by their own information communications department. They argue that internal healthcare technology experts can react to equipment issues faster and precisely.

Strict data and privacy regulations aimed at protecting patients in developing countries also pose difficulties to the free flow of data required in more integrated, innovation driven healthcare systems. For example, in the US, for instance, Health Insurance Portability and Accountability Act (HIPAA) laws keep healthcare experts from sharing any medical data without assent from the patient. In Germany, 50% of healthcare practitioners see patient data privacy and protection as a top hindrance to the implementation of healthcare technologies [6]. Patients also note health system bureaucracy as a noteworthy obstruction to the further coordination of healthcare in their nations. This view is particularly common in nations with extensive publicly funded systems, for example, the Netherlands and Sweden, while those in developing countries are mostly not aware of bureaucratic obstructions.

3.5 Opportunities in MES Integration

Adoption of MES will lead to creation of a pool of equipment set based on existing inventory requirement, and this will be backed up by a replacement cycles within the contract period. It will also transform fixed assets into service needs. Features and functions will be linked to clinical requirements and the projected workload. The tailored service delivery will create opportunities for clinical excellence which will be embedded in the new technologies. This will in turn mitigate future uncertainties such as reimbursements, poor functioning equipment and allow exchange of assets [1].

The overall effect will be elimination of service fragmentation which gives room for creation of service coordination across the entire equipment pool regardless of the manufacturer and clinical area. There if final opportunity of creating financial capacity due to efficiencies which can be redirected into further IT transformation and reengineering.

4. Conclusion

Successful MES integration in health facilities must be built upon shared objectives and aspirations. MES adoption must be aligned with organizational short term and long term goals for a secure future that allows hospitals to deliver the highest standards of health care to patients. This study has been able to identify the benefits of MES integration in health care, the potential weaknesses, opportunities, and the impediments to MES integration. For instance, this study has been able to reveal that MES offers hospital a relative advantage in that through public private partnerships (PPP) equipment manufacturers can install, run, maintain medical equipment while the clinical staff focus on patient care provision. Another advantage is that MES service includes maintenance, replacement, repair, procurement, delivery, installation, and clinical commissioning of medical technology. With this kind of benefits, government health facilities can provide better health services to the members of the public as part of basic human right.

Some of the identified weakness or problems facing MES integration is budgetary allocations and spending plans. Most public hospitals cannot bolster expanded spending on extra administrative personnel to seek after more proficient strategies for acquisition, maintenance, and care institutionalization. But limitations have been a real challenge.

It has been noted that healthcare institutions senior executives make equipment budget adjustments and instead procuring new technologies, they opt to service old ones. In other instances, there is no budgetary provision for maintenance at all which renders equipment obsolete prematurely. These frustrate members of staff in delivering quality healthcare. In terms of opportunities, an investment in MES provides health institutions an opportunity to avoid technology obsolescence, guarantee access to innovation and extensive resource administration, access to customized financial solutions, provision of long term spending plan and capital planning certainty.

The MES threats identified from literature fast-emerging computer-based innovations that pressure service providers to keep on innovating. Another major issue is lack of coverage for equipment procured outside the MES (private or departmental), an absence of home healthcare equipment maintenance and difficulty retaining high-quality clinical engineers because of the healthcare technology management. Practitioners view that healthcare institutions are best served by their own information communications department. They argue that internal healthcare technology experts can react to equipment issues faster and precisely.

In conclusion, trust is needed between hospital management and MES providers in order to guarantee long term MES benefits. Despite the disparities among developed and developing countries, the study highlights to other divides in views on health systems integration, maintenance and medical technology.

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