REVIEW ; DEPLOYING HEALTHCARE ADMINISTRATION, MEDICAL RECORDS, BIOMEDICAL EQUIPMENT TECHNICIAN AND MEDICAL LABORATORY STAFF ON THE FUNCTIONALITY OF MEDICAL EQUIPMENT IN LABORATORY

Nawaf Hamed Alotaibi[1*], Abdrabuh Mulfi Almutairi[1] ,Turki Abdulrahman Nofal[2], Mussad Saad Hujalan Alrashidi[2], Ashwaq Saud Alanazi[3], Hatim Ali Alshehri[4], Ali Mana Hadi Alshahi[5], Adel Mohammad Alalasi[6], Abdullah Saleh Saeed Omari[7], Meshal Saud Alsaedi[8], Mohammed Salim Alharbi[9], Entesar Ibrahem M Alsolemani[10], Khaled Saad AlRehaili[10] ,Thamer Husaen A Alwaal[10] ,Mohammed Ayidh Mofareh Alotaibi[11]

Abstract:
It is vital to have capabilities in information technology (IT) in order to realize the full potential of health information technologies in terms of enhancing the process of providing medical treatment. The Medical Equipment Network Documentation System (MENDS) is a straightforward communication network that facilitates the servicing of medical equipment, beginning with its failure and ending with its restoration. Many of the frameworks that have been offered in the past for the adoption of digital health are challenging to operationalize in these companies that are always changing. We offer nine dimensions along which clinically validated digital health technologies should be reviewed by health systems prior to adoption, and we also propose methodologies for selecting digital health tools and preparing for deployment in this setting. All of them are included in this piece for deploying healthcare administration, medical records, biomedical equipment technician and medical laboratory staff on the functionality of medical equipment in laboratory.

[1*]Specialist Health Administration, KAH& Osfan PHCCs
[2]Health service management specialist, Heraa general hospital-Makkah& Dhariya general hospital
[3]MEDICAL SECRETARY, Maternity and Children's Hospital in Al-Kharj
[4]Health adminstration, Cluster2_Riyadh, PHCC
[5]Specialist-Health Administration, Eligibility treatment and medical, coordination, NAJRAN
[6]Hospital Wadi alfora, Medical device maintenance technician
[7]Health information Technician - Algabasha PHC. Al Baha
[8]Health Administration Specialist, King Abdulaziz Hospital, Saudi Arabia.
[9]Medical Laboratory, Al-Rass General Hospital
[10]Lab technician, Iskan & Swaydrh PHCC
[11]Albajadia General hospital, lab specialist

[*]**Corresponding Author:** Nawaf Hamed Alotaibi
[*]Specialist Health Administration, King Abdulaziz Hospital, Macca

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Introduction:

Maintaining medical equipment in a sustainable manner in government hospitals located in low- and middle-income countries (LMICs) is something that is very necessary in order to provide excellent healthcare in an efficient manner. The consequences of medical devices that are not functioning properly include the loss of finances for healthcare, the lengthening of the time it takes to treat patients, and the deterioration of the quality of care that patients receive [1]. In low- and middle-income countries (LMICs), the World Health Organization estimated that more than fifty percent of medical devices are not functioning well, are not being used in the most effective manner, and are not being maintained [2].

The environment of this subject is quite complicated, despite the fact that huge health systems are gradually becoming more interested in investing in digital health solutions. There are a multitude of regulatory compliance considerations, and there are a number of unique barriers that prevent the successful adoption of new digital health tools within these large, complex organizations [3]. The market for the development of health-system-based digital health tools includes not only a large number of start-up companies, but also a number of incumbents and established players, such as large electronic health record (EHR) vendors.

Despite the fact that there are numerous frameworks for clinical validation of these tools, there are only a few techniques that define how to incorporate these validated tools into health systems. Furthermore, the literature on the deployment of digital health within large companies is limited. Existing frameworks for the implementation of digital health are challenging to operationalize for these dynamic organizations because they do not explicitly identify who stakeholders should be included, the responsibilities that they should play, or the sequence of steps that should be proposed. The need to conduct a more critical evaluation of this process is becoming more and more apparent. The COVID-19 pandemic demonstrated the usefulness of numerous digital health tools, but it also revealed that there are adoption and deployment strategies that result in the creation of very little value, a significant amount of frustration and inefficiency, and in some instances even the harming of patients [4].

The implementation of instructional programs for medical equipment technicians has been demonstrated to be successful in improving the overall functional state of medical equipment in hospitals located in countries with low incomes, according to a small amount of research that was conducted in the past [5].

Review:

During the first few months of the COVID-19 pandemic, the health care systems in the United States utilized a wide variety of development strategies in order to address a comprehensive range of issues. Many health systems soon discovered technologies that were produced from the outside by third-party suppliers because they were under pressure to swiftly expand their capacity for telemedicine. [6] This pressure was felt almost uniformly by health systems. In a similar manner, several health systems have resorted to utilizing pre-existing external vendor solutions that are based on chatbots or SMS in order to assist in screening patients and directing them to the proper services. Instead, each state passed slightly different limits on postponing elective surgery; because the criteria differed from state to state, many health systems turned to internal software-development teams to produce bespoke solutions to comply with state standards. This was done in order to ensure that they were in compliance with the restrictions. For instance, in order to fulfill the requirements for vaccination distribution and priority that are specific to the state of Wisconsin, ThedaCare, a health system situated in Wisconsin, contacted its electronic health record (EHR) vendor to develop a specialized application [7].

It is becoming increasingly common for large academic medical facilities to adopt an extra model of product creation, which involves the formation of partnerships with commercial sector organizations in order to collaborate on the development of digital health solutions [8]. The potential to scale the tool beyond the confines of a single health system, the possibility to create nonclinical revenue through intellectual property licensing4, and the ability to modify tools for ease of adoption and institution-specific needs are just some of the many benefits that this method offers to health systems. It is possible that it will also be beneficial for suppliers, as it will improve the possibility that the product that they are codeveloping would get widespread adoption [9].

When evaluating the utility and dangers of a digital health technology, there are a variety of clinical variables that can be considered. One of the most important things to undertake when contemplating adoption is to determine a meaningful and clear outcome metric that would be improved by the use of the technology in the short run. The Institute for Healthcare Improvement (IHI) has a quadruple

aim, which is to improve the health of populations, enhance the experience of care for individuals, reduce the per-capita cost of health care, and improve the experience of clinicians and staff [10]. A meaningful metric is one that affects one of these aspects of the quadruple aim. Burnout among healthcare providers, time savings, patient outcomes, and patient happiness are all examples of indicators that fall under this category. When it comes to tools that were produced by a third party, the vendor may occasionally be able to present customer case studies or empirical proof demonstrating that the utilization of their product is connected with improvements in some relevant outcome of interest. It is possible that a more effective method of capturing the value of a tool would be to measure its direct impact on a more granular outcome rather than on a more general one. For instance, it might be challenging to evaluate the "total provider time saved" of a tool, but it might be simpler to measure the "reduction in number of unnecessary consultations" of the instrument. For instance, the Mass General Brigham health system evaluated the effectiveness of their COVID Pass screening tool by determining the number of symptomatic individuals who were successfully prevented from entering the facility, the percentage of individuals who tested positive for COVID-19 within 14 days of a positive screen, and the percentage of individuals who had a positive screen who actually had a COVID-19 infection [11].

It is possible for a tool to be developed with the intention of enhancing a particular outcome; nevertheless, the true therapeutic usefulness of the tool is ultimately determined by whether or not it is truly capable of accomplishing this objective in clinical practice. It is necessary for the insights that the digital health tool gives to be converted into an actual human intervention in order to realize the value of the technology [12]. A digital health tool that is beneficial in practice is one that is able to activate a particular workflow. Previous research indicates that predictive models have the potential to make a difference in clinical outcomes when their output is combined with clinical interventions that are specifically targeted to the individual patient. Therefore, it is necessary to take into consideration both the target-result metric of the tool as well as its capacity to influence this outcome metric [11].

Electronic medical records (EMRs) and computerized physician order entry (CPOE) are two examples of health information technology (HITs) that are being rapidly implemented by health care providers as a direct response to the American Recovery and Reinvestment Act of 2009. Since the middle of 2008, the number of approved health information technology vendors in the United States has climbed from sixty to more than one thousand.1. However, a great number of academics and industry professionals have voiced significant concerns over the large and frequently unanticipated hazards that are associated with the use of HITs. These risks are further compounded by the incredible rate at which HITs are being developed and implemented [13]. It is possible that the provision of "meaningful use" in the Health Information Technology for Economic and Clinical Health (HITECH) program will just serve to prop up the HIT market without resulting in an improvement in quality. Even more worrisome is the possibility that this could result in health care providers being saddled with defective HITs that will be difficult to update or replace in the future [14].

It is beyond a doubt that information technology is a potent instrument that possesses a significant potential to revolutionize the medical field. The question that needs to be answered is how to correct it without squandering a significant amount of time and resources. For instance, during the 1990s, banks cut their number of branches by twenty-five percent and their number of full-time workers by twenty percent by leveraging investments in information technology. According to McAfee and Brynjolfsson, two of the most prominent researchers in the field of information technology, they conducted a study that spanned from 1960 to 2005 and included all publicly traded companies in the United States across all industries. They discovered that the performance spread across organizations had grown continuously as the most successful IT deploying organizations separated themselves from the rest of the pack. Rather than merely obtaining information technologies, these academics emphasize the need of effectively deploying and utilizing them in the workplace [15].

To a considerable extent, the ability of health information technologies (HITs) to accomplish the transformational vision that is envisioned in health care reform is contingent upon whether or not the systems that are built are designed to create the information that is necessary to make feasible the quality and cost improvements that are desired. The health information technologies (HITs) that are available today are not set correctly and do not provide adequate support for components of care delivery that are essential to enhancing care and reducing costs [15].

At the time that the federal government started paying billions of dollars to encourage hospitals

and physicians to use electronic medical and billing records, the objective was not just to increase efficiency and patient safety, but also to lower the costs of health care. It is possible that the transition to electronic health records is causing Medicare, private insurers, and patients to incur additional costs amounting to billions of dollars. This is because the utilization of electronic health records makes it simpler for hospitals and physicians to charge higher prices for their services, regardless of whether or not they deliver additional care [16].

The deployment of health information technologies is one of the most difficult undertakings because of the complexity of health care delivery and the extent to which HITs pervade the entire process of providing health care. A number of organizational factors, including the availability of information technology knowledge, amongst others, play a role in determining the degree to which HITs are successfully implemented. It is hardly surprising that the majority of health care providers are having difficulty properly deploying health information technologies (HITs). Outsourced human information technology systems have a propensity to "airdrop" information technologies without simultaneously bringing about changes in the management systems and organizational cultures of the organizations. The process of computerization, on the other hand, does not consist solely of purchasing computer hardware; rather, it encompasses a wider range of supplementary investments and developments, some of which require several years to bring into production [17].

It has been demonstrated in a number of studies conducted in the field of information systems management research that expenditures in information technology only result in operational gains when they are supported by the development of efficient IT capabilities. When an organization has the capabilities of information technology, it is able to acquire, implement, and adapt IT-based resources in order to improve the processes and performance of the organization. According to the findings of one study, increased spending on information technology has a detrimental impact on the performance of an organization when it is not appropriately directed into IT capability. This finding suggests that IT capability is essential in order to achieve improved organizational performance [18]. It is also important to note that this research highlights the reality that a massive investment in information technology may not necessarily be advantageous to the performance of a business. It is possible that this is the result of the incorrect infrastructure or incompatible systems, delayed and hasty implementations, or islands of automation that are fulfilling local demands without integration across the organization. For instance, Smith, Buller, and Piland conducted research on over 300 multi-specialty groups and 600 single-specialty groups. They came to the conclusion that "simply throwing resources at staffing or at major equipment support, such as computer hardware and software, probably does not necessarily lead to financial success...more is not always better." Consequently, rather than only ensuring that information technology is in place, it may be more beneficial to acquire the suitable IT design that is equipped with the skills necessary to accomplish the activities and goals at hand [19].

It is more appropriate for information technology to be arranged around business processes than the other way around.7 It appears that the information technology initiatives in the health care industry are more focused with technical issues, and as a result, they are missing the essential contextual factors that either make or break IT projects. This occurs as a result of the fact that conventional health care organizations do not possess sufficient information technology skills or capabilities. As a consequence, these organizations approach information technology initiatives in a very naive manner, treating them as if they were typical health technologies such as a new medical method or gadget. As an illustration, a comprehensive academic medical center appointed a registered nurse to the position of chief information officer, despite the fact that she had no prior experience or training in information technology. Furthermore, the individuals responsible for the implementation of the outsourced health information technology system were physicians who admitted that they lacked any knowledge or expertise in the field of information technology [19]. Whether or whether such managers are able to appreciate the information technology (IT) demands of the organization, the kind of IT systems and technologies that can satisfy those needs, and the kinds of modifications that can be made to organizational processes in order to improve health care delivery is difficult to fathom. Because of this, the private vendor has been charging extravagant prices for a subpar product, which has a negative impact on the quality of treatment that is being provided [20].

Conclusion:

The purpose of a clinical decision support system, often known as a CDSS, is to enhance the delivery of healthcare by providing focused clinical knowledge, patient information, and other health

information to improve medical decisions. Clinical decision support systems (CDSS) have been demonstrated to assist healthcare personnel in a wide range of decisions and duties related to patient care. In the present day, CDSS actively and ubiquitously support the delivery of quality treatment. There is additional data supporting certain applications of CDSS, particularly those that are based on CPOE implementation. The number of people who are supporting CDSS continues to increase in this day and age of electronic medical records; nevertheless, there are still more advancements that need to be made, such as interoperability, speed and ease of implementation, and price. At the same time, we need to remain attentive for the possible drawbacks of CDSS, which can vary from simply not working and squandering resources to exhausting clinicians and decreasing the quality of care that is provided to patients. By adopting, deploying, and operationalizing digital health tools, large health systems face unique and complicated problems that stand in the way of major potential advances in healthcare services. These challenges represent a barrier to the development of healthcare services. In this essay, we present nine essential aspects that can assist these organizations in identifying digital health solutions and implementing them in a strategic manner. Health systems are able to decide how to select or develop a digital health solution by evaluating prospective tools along the dimensions described in this article and summarized in this table. These dimensions include the product-selection approach, the return on investment (ROI) and clinical value, internal champions and executive sponsors, data assets required for functionality, alignment with institutional priorities, requirements for implementation, and long-term operations. Additionally, health systems are able to determine whether an existing tool is worthy of adoption, ensure that they have sufficient resources for deployment and long-term use, and devise a plan for implementation.

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