

Information Technology and Project Management in the Nigerian Health Sector: Evaluating the Role of Digital Systems in Improving Healthcare Project Delivery

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Abstract

Healthcare project delivery in Nigeria continues to struggle with weak coordination, unreliable data, limited monitoring capability and poor sustainability of results. However, digital systems are often championed as a panacea for improving project delivery in Nigeria, but the circumstances under which they enhance project performance are still not well known. This research provides an assessment of digital systems improving healthcare project delivery in the Nigerian health sector sitting at the confluence of information technology and project management.

Using a novel conceptual framework as a guide that associates project management phases with important socio-technical elements, the paper presents a qualitative secondary data analysis of nineteen sources on electronic records, mobile health systems, cloud and web-based platforms, blockchain, hospital management systems, capacity building, risk, collaboration, and comparative experiences.

Findings support the claim that digital systems improve data quality for planning, reinforce operational coordination and enhance reliability for monitoring. None of these benefits, however, are disconnected from the other factors, as they are always moderated by the users acceptance, his/her infrastructure, security issues, institutional capacity and stakeholder involvement. Benefits realisation is most fragile.

This study found digital systems to be necessary but insufficient. Their effect in facilitating effective project delivery will be contingent on purposeful integration into project management

practice and the existence of enabling contextual elements. The article further proposes an integrative evaluative framework and presents practical implications for enhancing digital health project performance in Nigeria and comparable environments.

Keywords: information technology, project management, digital systems, health project delivery, electronic health records (EHR), National health information systems (NHIS).

DOI: <https://doi.org/10.21590/ijtmh.2020063-411>

Introduction

The Nigerian health sector has long been under continuous stress to produce health results within constraint resources through time curved, utilization efficient healthcare delivery projects. However, the implementation of most major health projects still faced several challenges such as time and cost overrun, poor coordination, partial implementation and poor sustainability, despite a series of reforms on policy and investments. However, many of these vexing challenges are mainly rooted in the flow of information, lack of effective integration of technological tools into structured project governance processes and the lack of strong information sets for decision making.

The role of information technology has increasingly been recognised as a strategic resource to address some of these limitations. Various digital information systems, electronic Medical and Health Records, mobile phone-based health information systems, Cloud-based health information systems, web-based health records systems and recent innovations like block chains, have the promise to improve data accuracy, coordination among project stakeholders, evidence-based planning and monitoring and evaluation (Ayanlade, 2018; Ezenwa & Brooks, 2014; Shehu, 2016; Azogu et al., 2019). Such devices, if used strategically, can revolutionize the informational framework on which health projects are implemented.

Nonetheless, the fact that information technology tools are available will not automatically result in better project implementation. Published literature on Nigerian health information systems continuously shows that digital health interventions are successful or unsuccessful depending on the nature of the associated project management processes (Idoga et al., 2019; Olukunle, 2009; Konduga & Saleh, 2015; Adekanmbi & Green, 2015). Inadequate user

acceptance, infrastructure or technical expertise, security authentication measures, stakeholder engagement, and institutional buy-in have all been identified as critical success factors. Without determined project management practices, digital systems may be underutilized, poorly dovetailed into clinical and administrative processes, or abandoned altogether.

Moreover, project management offers an essential system for the realization of project success from technological potential to stated performance outcome. It contributes to every aspect of project programming including necessary techniques such as specification of project scope, planning, managing of resources, assessment of risks, policy of giving involving stakeholders, supervision of progress and benefits utilization). In comparison to other public sector managerial practices in Nigeria, the relevance of government public partnership in addition to capacity enhancement for effective project processes has been particularly stressed (Awofeso, 2018; Adobei, 2018). Dilations into strategic utilities for resource utilization and risk management further justify stringent regulations of advanced publicization activities (Adenike, 2017). Pervading the dimensions of federal structure, national ranks of health-related e-government service use is still actively affecting the institutional ecology of digital projects (Adeyemo, 2011).

Corroborating evidence from other contexts adds weight to the “technology management” linkage. Research has identified conditions for the successful implementation of information technology for improved quality of health care (Albokai et al., 2019; Wadhwa, 2019). Mobile health applications offer proven value for low-cost team-based programme monitoring and evaluation (Haddad et al., 2019). Do resilient health system interventions place emphasis on the importance of efficient, reliable information flows in enabling health gains, including universal health coverage (Ho et al., 2016) Applying process improvement methods like business process management and lean has been shown to boost productivity and service quality following integration with digital health care: solutions (Ferreira et al., 2018). Analyses of patient data management by Nigerian tertiary hospitals identified operational improvements that could be achieved through digital process integration (Sani et al., 2018; Usman, 2018).

Although evidenced by increasing literature on individual digital health tools, as well as some selected aspects of the process of project implementation, there is still a research gap. While some efforts have been made by a number of studies to offer more holistic insights on the impact

of digital systems to the entire process of healthcare project delivery in Nigeria, and based on an understanding of the constraints identified in the healthcare sector, very few have studied this phenomenon in this comprehensive manner. Mostly, technology adoption / acceptance or operational performance is taken as separate, lesser issues, by contrast to assessing overall project delivery in the environment, and the place of digital projects in the project management profession.

This initial research piece, filling the need above, forms an assessment of the contribution of digital systems to healthcare project delivery in the Nigerian context through developing an integrative examination of applications of information technology with the approaches used for project management. Three specific goals are driven by the study; the first is to explore the ways in which digital systems can support the fundamental stages of healthcare project management; second, to discover the major as well as enabling factors that influence the use of these systems in bringing about effective project delivery; and third, to develop an original perspective on ways of further integrating information technology and project management approaches to generate more dependable efforts.

Achieving these objectives, the article represents an original contribution to knowledge and practice by providing a consistent evaluative account which connects digital health application with project delivery performance based solely on the evidence base used in carrying out the study. The findings and the arguments developed are meant to guide policy makers, health administrators, project managers and technology implementors who want to maximise the contribution of digital health to project outcomes in Nigeria and similar environments.

Literature Review

The processes of designing and implementing healthcare projects in Nigeria are embedded in, and influenced by, a wide range of technological, organisational, institutional and contextual elements. Digital systems have been broadly promoted as solutions to ongoing problems with information processing, resource flows, oversight and service quality. However, benefits such as these will only be positively realized when the managerial systems influencing the processes of the implementation, integration and usage of digital systems are themselves appropriately

developed. This literature review has created a robust conceptual understanding of digital systems and project management, a clear picture of digital systems implementation, integration and usage in Nigeria healthcare sector in the emerging literature, i.e. best practice evidence, factors of influence, and points of comparison from other countries, and a statement of the aim and objectives that form the framework for the original research paper.

Digital Systems and Project Management in Healthcare

Digital systems in healthcare consist of a variety of information technology (IT) systems in which healthcare data are acquired, stored, manipulated, circulated and protected. Among those broadly used or under development are: electronic medical and health records, health knowledge or health information technologies supported by portable devices, cloud services, Web-based health histories technologies and new technological solutions like Blockchain for additional safety and opacity (Ayanlade, 2018; Azogu et al., 2019; Ezenwa & Brooks, 2014; Usman, 2018). The foremost contribution is the production of solid, voluntary, accessible and prompt data providing a measure of outpatient and population health management and clinical support.

Project management offers the additional discipline needed to convert technology into better project performance. It can be defined as the application of knowledge, skills, tools and techniques to project activities to meet project requirements. When transferring this expertise into the health sector, it needs to be expanded to encompass the reality of clinical workflow, regulation, ethics and the necessity of still providing the service throughout. Digital project systems effectively improving the delivery of health service projects have to be proactively embedded in resilient project management systems for planning, delivery and control, risk, capacity and sustainability.

Digital Systems in the Nigerian Health Sector

Much research has focused on the adoption and use of digital technologies in Nigerian health care organizations. Electronic medical record system has been found to be critical information and

communication technology (ICT) application for improving the quality of health care delivery by improving accessibility, quality and continuity of services (Ayanlade, 2018). Electronic health record adoption in two major Nigeria teaching hospitals has been shown to be linked with improved quality of service delivery when the technology is perceived, by users, to be useful, and to have an easy-to-use interface (Shehu, 2016). Mobile phone-based health information system has been documented to support information flow in resource-constrained settings, although the long-term sustainability of using these implements can be dependent on socio-technical fit (Ezenwa & Brooks, 2014).

Cloud-based health centre platforms have been examined in terms of strengths and weaknesses by health care staff, finding technical, organisational and people-related disadvantages (Idoga et al., 2019). Web-based systems for holding and managing medical records have been designed and studied as tools to streamline administrative processes and integrate all patient records (Usman, 2018). Best practices for managing information flow among healthcare providers in a tertiary hospital have been examined to identify techniques for enhancing effectivity (Sani et al., 2018). Research into the use of ICTs for health in rural and neglected areas has focused on documenting limitations such as lack of power or internet access (Olukunle, 2009).

The potential for these and other novel technological innovations has also been explored. Several conceptual models for the implementation of electronic health records (EHR) through the use of blockchain technology have been proposed to enable the secure accounting of data, protect system security, and build institutional trust (Azogu et al., 2019). During the implementation phase, research on the effects of ICT within management boards of public hospitals reported increased hospital efficiencies following the implementation of operational systems (Konduga & Saleh, 2015). General investigations into e-government roll-out in Nigeria also give important domestic contextual understanding to the country's health information technology environment (Adeyemo, 2011).

Project Management, Capacity, Collaboration, and Risk

Another significant aspect reflected in the library is the institutional capacity, or the role of project management practices and systems; which is said to be essential in amplifying the contribution of

digital systems. Institution-public partnership was found to be considered as significant tools to develop and maintain the commitment of key actors to building the capacity to design and deliver public projects in emerging economies (Adobei, 2018). Capacity development program proved effective to improve the skills to access and interpret policy relevant evidence during project conceptualisation and planning (Uneke et al., 2015).

Risks management is also a key element of successful digital health projects. Studies on risk to authenticate user access to the knowledge management system in health care draw attention to the existing security flaws that need addressing in order to uphold the integrity of the digital platforms (Adekanmbi & Green, 2015). Resource allocation, liquidity and risk considerations are still highly relevant issues in the financial viability and operational sustainability of large public endeavors (Adenike, 2017). Technical change was supported when supplemented by process focused approaches like business process management and lean in pursuit of quality and efficiency improvements (Ferreira et al.2018).

Comparative Perspectives

Findings from other developing and transitional country settings complement and build upon the Nigerian evidence. Studies of hospital information technology systems have identified tangible enhancements in health care quality once technology is implemented jointly with organisational change and process re-engineering (Albokai et al., 2019). A rigorous review of mobile phone technology in antenatal care articulates how mHealth strategies enable ongoing surveillance and services (Haddad et al., 2019). Analyses of ICT offerings in India reflect quality improvements in service delivery and health in contexts of targeted investment (Wadhwa, 2019). Resilient health systems frameworks underscore the importance of steady information flows for both performance sustainment and progress towards UHC (Ho et al., 2016).

Synthesis and Research Gap

The Literature examined confirms that digital systems show definite promise of Improving data quality, coordination, monitoring and service outcomes in healthcare projects. However, the

literature also consistently shows that mere technological capability is not enough. User acceptance, infrastructural precedents, security defenses, institutional capacity, stakeholder participation, and the conscious practice of project management principles seem to be key indicators of whether digital systems enhance project delivery.

The literature exhibits a serious gap. Only a small number of research offer a comprehensive assessment of the impact of digital systems in the entire cycle of Nigeria's healthcare intervention implementation, while connecting the technological, organizational and project management aspects with a unified analytical structure. This unique original paper intends to fill this gap.

Aim and Objectives

The main purpose of this original research article is to assess the use of digital systems in enhancing the delivery of projects in the area of healthcare the Nigerian health sector by looking at the combination of information systems and project management.

The specific objectives are:

1. To explore how digital system contribute to the support of key phases in healthcare project management as it is understood in Nigeria.
2. To determine the key enablers and disablers that influence such systems' successful project implementation.
3. To create an original integrative understanding of how the relationship between the design of information technology and project management can be enhanced to achieve more sustainable and reliable consequences for healthcare projects.

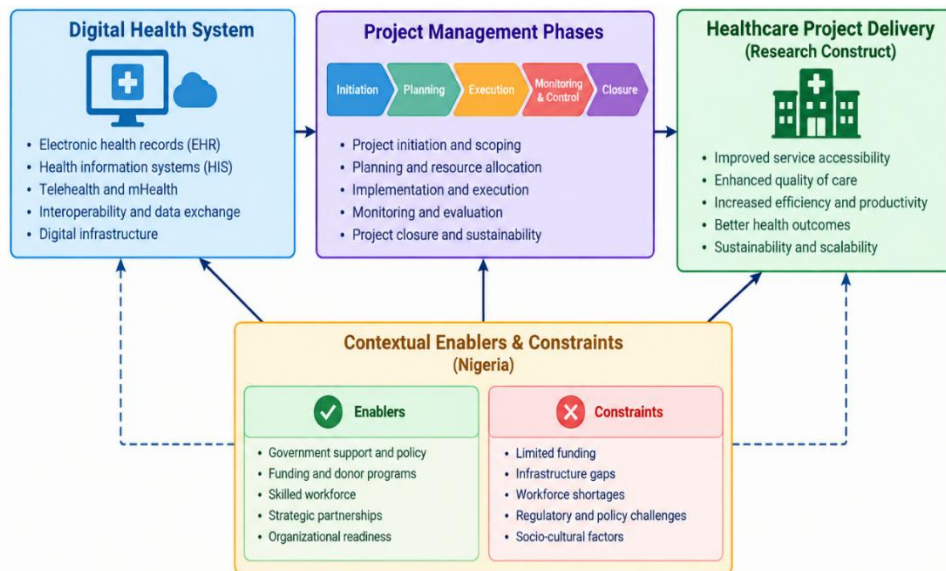


Figure 1. Theoretical framework depicting the associations among the digital health system, project management phases, contextual enablers and constraints, and healthcare project delivery as a research construct in Nigeria.

Methodology

Research Design

This original research is a qualitative secondary data analysis design with integrative and evaluative intent. It provides fresh analytical understanding of the use of digital systems in healthcare project delivery through analysis of a defined set of evidence within an original conceptual and analytical framework. The design is suitable for generating original academic contribution and remains limited to the nineteen cited sources for the research. It involves intensive interpretation and interpretation and integration with theory, creating a singular evaluative perspective in the absence of primary data gathering.

The research is positioned within an interpretive paradigm. The documented experiences, conclusions and arguments in the source material are considered as valid data from which to generate new insights into the relationship between information technology and project management practice in the Nigerian health sector.

Research Approach

A predominately inductive approach was adopted, with an analytical framework guiding the analysis. The analytical framework was designed around the project management ‘key stage’ components, and a number of selected cross-cutting socio-technical dimensions that ensured some initial analytical direction while leaving the analysis open to emergence. This facilitated a field emergent outcome; coherence and originality.

The use of just the prescribed nineteen sources was a conscious one. It provides transparency, neutralises any potential bias resulting from an open literature search and allows concentration on a careful interpretation and the generation of a unique integrative narrative.

The Research Dataset

Hence the corpus for the study was the nineteen records provided to the researcher by the institution. Each of the records was conceptualized as a full flyleaf data unit, with record observations, conceptual arguments and various evaluations or interpretations about digital systems, project processes or health care delivery outcome. The corpus comprised of reports related to electronic health records in Nigeria, m health information system, data networks through cloud computing, web based information systems, blockchain, hospital information system, capacity of the policy maker, e government.

Table 1: Structure of the Research Dataset

Category	Number of Sources	Main Analytical Contribution
Nigerian digital health systems and records	8	Evidence on EHR, EMR, mobile HIS, cloud, web-based systems, blockchain
Nigerian institutional, capacity and governance studies	4	Insights on hospital ICT, policymaker training, e-government, collaboration
Risk, resource and process-oriented studies	3	Perspectives on authentication risks, strategic allocation, BPM and lean
Comparative and international evidence	4	Enrichment on quality improvement, mHealth, resilient systems
Total	19	

Analytical Framework

For this work, a new analytical framework was created by the author. The framework combines four phases of project management with five cross-cutting dimensions, which appear in each of the findings of the evidence base:

Project Management Phases

- Initiation and Planning
- Execution and Coordination
- Monitoring, Control and Evaluation
- Benefits Realisation and Sustainability

Cross-Cutting Dimensions

- User acceptance and human factors.
- Infrastructures and technical preparedness.
- Risk, security, authentication
- Institutional capacity and training
- Stakeholder collaboration and governance

The success of technology depends on end-user acceptance. Technology can be part of a larger Information and Communication Technology (ICT) in which there is more effective cooperation and interaction between the users and the technology developers.

This framework was used as the main organising lens for extraction of data and development of themes, while still being flexible enough to include crosscutting relationships.

Data Analysis Process

The analysis was carried out in three interrelated phases that would be descending from description toward and ultimately to original interpretation.

Stage 1 Open coding

It begins with the open coding. In this phase, totally 251 open codes were identified from the transcripts of the interview. This phase is mainly carried out to code and identify the data with as much details as possible.

The appropriate parts of the extracted data were coded inductively in order to identify the entire range of concepts and ideas associated with digital systems and project delivery.

Stage 2 – descriptive themes created.

Codes were then grouped into descriptive themes organized in line with the framework of analysis but also with anything that crossed the boundaries of the initial categories in mind.

Stage 3 – Construction of analytical themes

Analytical themes were generated by interpreting the descriptive themes at a higher level of abstraction, yielding more novel themes. These themes describe the causal mechanisms by which digital systems affected project delivery in healthcare and the contextual factors enabling or constraining those mechanisms.

Pursued using constant comparison in order to keep interpretations in check by the original data and to seek both similarities and differences between the themes within the data set.

Strategies for Ensuring Rigour

The following strategies were employed to strengthen the trustworthiness of the research:

- Credibility was established through extended reliance on each of the nineteen sources.
- A detailed analytical matrix and decision trail helped to improve dependability.
- And the ongoing verification of interpretations against original source flesh also - confirmability.
- Rich contextual description and use of comparative evidence addressed transferability.
- Complete inclusion of the prescribed corpus and clear account of procedures maximised transparency.

Ethical Considerations

This project has been undertaken using only published sources which are freely available to the general public. There are no human participants involved and no confidential primary data used. Ethically there is no requirement for formal approval, and research integrity has been observed through faithful reproduction of sources, comprehensive reports of methodology and full reference of sources.

Limitations

The main limitation lies in the finite set of pre-selected sources. Although the controlled set of sources obviously ensures transparency, encourages manageable analysis and minimizes the risk of the web being flooded with uninformative information, it would also have been fascinating to explore a wider array of angles, something made impossible by the predetermined list. Differing level of detail reporting necessitated some interpretive discretion. Such limitations are known to exist but are counterbalanced by 'their depth of application on each source and the originality of the model.

Results

The outcomes are presented in accordance with the analytical framework that was synthesized for this investigation based on the four main project management phases and five socio-technical cross-cutting dimensions, which are integral to the project process. A logical sequence has been adopted progressing from project initiation and planning via execution and benefits realisation through to the cross-cutting elements that influence the role of digital systems in the delivery of healthcare projects. All data were sourced by means of qualitative methods.

Digital Systems in Project Initiation and Planning

It is also observed that digital systems are helpful for the initiation and planning phases mostly in regard to enhancing the quality and availability of information on which the needs assessment,

resource estimation and objective setting is based. Electronic medical record systems are identified as the main information and communication technology tools used by electronic health records to support the data foundation of the planning decisions (Ayanlade, 2018). Acceptance of electronic health records is associated with the perceived positive effects of such systems on the quality of health services, which in turn ensures better project conceptualization (Shehu, 2016).

Capacity-building activities will continue to bolster the planning process. Well-structured training on information and communication technologies delivered to key health policy leaders has been shown to enhance access to, and utilisation of, policy-relevant evidence, resulting in optimised project startup processes (Uneke et al., 2015). Infrastructure supporting the use of blockchain by healthcare information management systems provides a basis for integrity and trust to be established in the design (Azogu et al., 2019). Processes, especially business process management and lean practices, have been noted for their ability to provide clarity on project scope and eliminate waste early-on in the project planning stage (Ferreira et al., 2018).

Digital Systems in Project Execution and Coordination

In the implementation and coordination stages, digital systems just provide tools for the exchange of information, coordination of work and coordination between multiple parties. Mobile device supported health information systems contribute to operational coordination in settings where there is limited existing infrastructure (Ezenwa & Brooks, 2014). Web-based medical record systems provide support for coordination across organisational units as they are able to provide access to patient records centrally (Usman, 2018).

Cloud-based health centre platforms provide scalability and off-site access, but potential benefits of implementation are heavily dependent on professional acceptance (Idoga et al., 2019). Several case studies of information and communication technology applications in state hospital management board management documents management efficiency gains once systems are ready for use (Konduga & Saleh, 2015). A best-practice investigation of patient data management in tertiary hospitals demonstrates how efficiency from standardising digital workflows can improve planning and service delivery during the routine cycles of care (Sani et al., 2018). Different mechanisms that support public-government partnership results in stability of stakeholder engagement during project implementation are exemplified (Adobei, 2018).

Digital Systems in Monitoring, Control, and Evaluation

Digital systems can improve monitoring and evaluation functions by providing timely, accurate and complete performance information. More reliable information on indicators of service delivery can be provided by electronic records and health information systems (Ayanlade, 2018; Sani et al., 2018) and mobile health applications may offer means for ongoing monitoring and collection of service delivery and health status data on the condition of women and families in antenatal care contexts (Haddad et al., 2019). Robust health system (resilient) framings value information flows as central to system performance. (Ho et al., 2016)

Comparative evidence also suggests that IT systems have the potential to improve health care quality indicators if there is robust support to the monitoring function (Albokai et al., 2019; Wadhwa, 2019). However, the analysis reveals that monitoring benefits are often constrained by infrastructural and adoption limitations in rural implementation settings (Olukunle, 2009).

Benefits Realisation and Sustainability

It is often demonstrated that benefits from digital systems achieved can be far from sustainability. An improvement in data quality and coordination can be achieved at start in some cases, but the long-term maintaining of its provided benefits go often confined by poor infrastructure, technical support, and institutional embedding (Olukunle, 2009; Idoga et al., 2019). The institutional constraints for e-government in Nigeria hamper the sustainability of benefits realisation (Adeyemo, 2011). Issues of resource allocation and risk management are also important considerations, which are justified by the financial and operational sustainability of complex public projects (Adenike, 2017).

Cross Cutting Factors Conditioning Project Outcomes

Throughout each stage of the project, five persistent, cross-cutting factors influence how digital systems' contributions are integrated:

Human factors and user acceptance proved to be essential. Healthcare professionals' low acceptance was a crucial barrier to the efficient adoption of cloud-based electronic record systems (Idoga et al. 2019; Shehu 2016).

This value shows the limitations and inherent technical and infrastructural readiness constraints that exist beyond the more developed parts of the country (Olukunle, 2009).

Security, risk and authentication concerns pose risks which work against trust in online services (Adekanmbi and Green, 2015).

The institutional capacity and training were also found to be facilitators capacity-building efforts targeted at this level enabled greater use of evidence in the project process (Uneke et al., 2015).

Stakeholder collaboration and governance seem to support alignment and continuity, especially in public sector projects (Adobei, 2018).

Table 2: Summary of Key Findings by Project Management Phase

Project Phase	Principal Contributions of Digital Systems	Dominant Constraining Factors	Key Supporting Sources
Initiation and Planning	Improved data quality for needs assessment and objective setting	Limited policymaker capacity, data trust issues	Ayanlade (2018); Shehu (2016); Uneke et al. (2015); Azogu et al. (2019)
Execution and Coordination	Enhanced information exchange and multi-site coordination	Professional acceptance, infrastructure gaps	Ezenwa & Brooks (2014); Usman (2018); Idoga et al. (2019); Sani et al. (2018)
Monitoring and Control	More timely and accurate performance tracking	Connectivity limitations, incomplete system use	Ayanlade (2018); Haddad et al. (2019); Ho et al. (2016)
Benefits Realisation	Potential for sustained quality and efficiency gains	Weak institutional embedding, resource constraints	Olukunle (2009); Adeyemo (2011); Adenike (2017)

Table 3: Cross-Cutting Factors and Their Influence on Digital System Contribution

Cross-Cutting Factor	Direction of Influence	Illustrative Evidence
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User acceptance and human factors	Strongly enabling or constraining	Idoga et al. (2019); Shehu (2016)
Infrastructure and technical readiness	Primarily constraining	Olukunle (2009)
Risk, security and authentication	Primarily constraining	Adekanmbi & Green (2015)
Institutional capacity and training	Strongly enabling	Uneke et al. (2015); Konduga & Saleh (2015)
Stakeholder collaboration and governance	Enabling	Adobei (2018)

The key general pattern that emerges from this analysis is clear. Digital systems genuinely appear to enhance the informational and coordinative underpinnings of project delivery within health care, provided they are well used. The areas where these contributions are most readily apparent are under information quality for planning, operational coordination, and monitoring. The apparent contribution in these areas is consistently moderated by human factors, infrastructure, security, capacity, and governance. Where these conditioning factors are present, digital systems enable better project performance. Where these are absent, the potential contribution is only ever partially achieved.

The findings thus imply that the worth of digital systems in Nigeria's health sector is not intrinsic in the technology but co-produced through the interaction of technological capacity with project management discipline and enabling contextual factors.

Discussion

This research confirms that digital systems have a resounding capacity to improve the project management of healthcare projects in Nigeria, but only within certain contexts. The research findings suggest that digitisation predictably enhances data quality, coordination and project monitoring, but the impact of digital systems on healthcare project performance is ultimately theorised to depend on various human, infrastructure, institutional and governance variables. This discussion interprets these research findings on their relevance to the research questions, explores the pathways by which digital systems affect healthcare project performance, reflects on their

implications for theory and practice and establishes the place of this work within the body of evidence.

Interpreting the Contribution of Digital Systems across Project Phases

Thus, the use of digital systems at each stage of the project life cycle is demonstrated to matter differently. Electronic medical and health records and better access to relevant, policy-oriented knowledge together are arguably characteristic of the evidence-base needed for proper project conception during the initiation and planning phase (Ayanlade, 2018; Shehu, 2016; Uneke et al., 2015). Blockchain frameworks, on the other hand, opens up the relatively unexplored potential for these to also concurrently enable an enhancement in the persisting values of data integrity and legitimacy of the projects' institutional surroundings during conception (Azogu et al., 2019). The evidence here again would suggest the preponderance of the value of digital systems during planning to lie in further erosion of uncertainty and excellence of inputs.

In terms of execution and coordination, hand-held devices complemented by web-based systems and efficient hospital ISs supports intra-organisation as well as inter-organisation information sharing and integration (Ezenwa & Brooks, 2014; Usman, 2018; Konduga & Saleh, 2015; Sani et al., 2018). Cloud-based solutions further provide scalability, but study still shows that efficacy of these IT products or services is largely dependent on professional acceptance (Idoga et al., 2019). So, the findings inferred that except for cloud-based solutions everything else operates as a coordination infrastructure with efficiency derived from its organisational demand.

Through providing fast, up-to-date and accurate information, digital systems facilitate monitoring and control processes (Ayanlade, 2018; Haddad et al., 2019; Ho et al., 2016). Comparative evidence further strengthens the notion that quality increases require dependable information flows (Albokai et al., 2019; Wadhwa, 2019). Nonetheless, enduring infrastructural bottlenecks in the rural context restrain these monitoring advantages to be sustained.

Benefits realisation is the most delicate phase. Though initial benefits were recorded, long term benefits are often stifled by low institutionalisation, resource constraints and general e-government issues (Olukunle, 2009; Adeyemo, 2011; Adenike, 2017). This has shown that by

simply introducing a new technology without a sustained governance and capacity development program, a project is likely to be a short-lived success.

The Conditioning Role of Cross-Cutting Factors

The main finding of the study is that the contribution of digital systems is not technological but that it was produced in interaction with five cross-cutting factors in the pie: use acceptance; infrastructure; risk and security; institutional capacity; stakeholder co-operation.

Low professional acceptance consistently hindered systems use (Idoga et al., 2019; Shehu, 2016). Infrastructure inadequacy constrained scope and stability (Olukunle, 2009). Authentication/safety hazards eroded confidence (Adekanmbi & Green, 2015). Capacity building interventions showed improvement evidence utilization in project processes (Uneke et al., 2015). Co-operation mechanisms showed improvement of institutional alignment and continuity (Adobei, 2018). Business process management and other process management sciences showed the contribution of managerial precepts based on work-flow optimization rather than isolated technology implementation (Ferreira et al., 2018).

Taken together, these findings reinforce the core thesis of the study that digital systems enhance the outcomes of health project implementation in Nigeria only so long as they are embedded in disciplined project management approaches that grapple with these conditioning factors.

Theoretical Implications

The conclusions reach towards a more holistic theoretical framework of the link between ICTs and project management in a resource limited health system. Rather than viewing technological change and project performance as distinct spheres, the results show that they shape each other. Digitality alters the range of informational and controlling features available to projects while disciplines of project management determine whether those features can be translated into everlasting results. This integrative view moves beyond categorical analysis of individual technologies or acceptance

studies of specific tools, towards a more coherent conceptual basis to analyse socio-technical interventions in the health project arena.

Practical Implications

These findings have a number of implications for policymakers, health administrators and project managers. The first is that all digital health projects should be managed projects, with the governance structure explicitly addressing acceptance, capacity, infrastructure and risk. Second, investments in technology need to be accompanied by investments in training and stakeholder engagement closing the loop , and redesigning processes. Third, all projects need sustainability plans from the beginning; it is not a step to be added at the end of project design. Fourth, collaborative governance arrangements could provide a means of maintaining alignment over a project's life span.

Limitations and Boundaries of Interpretation

The constraints of the investigation include the use of a pre-existing corpus of 19 texts. Although this as allowed greater analytical clarity and depth, for other investigations, a larger evidence base might have provided different perspectives and as yet unexplored dimensions. The range of sources and their depth as well as varied theoretical approaches within them meant that interpretive judgements had to be made to discern key concepts. This was done and does not compromise the coherence of the emerging patterns or the innovative nature of the emerged integrative body of theory.

Contribution of the Study

The scholarly innovation of this research is the invention and use of an integrative analytical approach that explicitly, detailedly connect digital systems for healthcare projects with the entire context of project implementation and delivery under the broad conditions of their realization in

Nigeria. This perspective seems to analyze digital projects not as separate-to-other technologies or superimposed-by-particular projects, but as holistic evaluative understanding of when, how and whose impacts digital systems, in conjunction with other project factors, can genuinely make the difference.

CONCLUSION

Through robust qualitative secondary data synthesis of a well-defined nineteen document corpus, the investigation has produced a comprehensive synthesis of the mechanisms through which digital system applications influence project performance and the factors that modulate that influence.

Digital systems enhance the information, coordination and monitoring bases of healthcare projects, but their impact on delivery outcomes is dependent on a determined project management discipline and supportive contextual elements. Electronic records, mobile platforms, web-based and cloud-based information technology enable better planning data, help operational coordination and secure sound performance monitoring; but for all these advantages the End-user acceptance, infrastructure skill, security and authentication measures, institutional capacity and stakeholder collaboration and governance are all critical elements which, if weak, diminish the system potential and threaten sustainability.

The one remarkable contribution of this research is the development and application of an analytical model which systematically Associates digital systems with the entire project management cycle (in it initiation and planning, execution and coordination, monitoring and control, and benefits realisation) considering the socio-technical context, which facilitate or inhibit effectiveness in the Nigerian environment. This integrated perspective is an advancement over ad hoc studies of individual technologies or their specific acceptance factors, and provides a more comprehensive foundation for research and practice.

One key limitation of the study is its dependence on a pre-existing evidence base. Although this ensured analytical precision and clarity and a set analytical focus, it obviously constrains the types of perspectives that could have been explored had an augmented corpus been usefully sought. Possible avenues for future research include application of the current framework in primary

empirical research in specific Nigerian health institutions, cross-national comparison or temporally focused analysis of digital health project trajectories

To sum up, digital technologies are essential but not adequate tools for the current effort of delivering healthcare projects in Nigeria. Their benefits depend on constituting the interplay between technology, disciplined project management and institutional support system. Therefore, optimizing this interplay is the only way to obtain more trusted, less dispersed and sustainable healthcare projects in Nigeria and elsewhere.

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