Healthcare Digitalisation in Ghana: An Assessment Based on the Realist Social Theory

Emergent Research Forum (ERF)

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Abstract

Healthcare digitalisation is one of the technological innovations within the health sector, with prospects to improve the overall performance and quality of health care around the world. The Ghanaian health sector, as in many developing countries, seeks to continuously improve patient care through the use of various healthcare technologies. The extent of digitalisation within the Ghanaian health sector, however, still remains undetermined. Underpinned by critical realism, this study seeks to understand the generative mechanisms of digitalisation in the health sector of Ghana. The study seeks to answer the following research questions: what are the generative mechanisms of digitalisation in the health sector of Ghana? How are the varying degrees of digitalisation interpreted and explained in the empirical world? We draw on the Realist Social Theory which adopts the principles of critical realism to answer the underpinning research questions.

Keywords

Healthcare, Digitalisation, Critical Realism, Developing Countries, Information Technology

Introduction

The introduction of healthcare technologies within the health sector has often been considered as a panacea to the numerous challenges faced by healthcare providers and organisations (Berwick, 2002). In view of this, the implementation of various health information systems, with the aim of digitalising patients’ health records, has increased tremendously over the past decades (Mihailescu, Mihailescu & Schultze, 2015). Digitalisation of health records, i.e. the conversion of paper-based records into computerised form, presents opportunities for increasing the overall quality of healthcare and patient safety, while reducing cost and time in workflow (Dohan & Tan, 2014).

In spite of the significant potential gains that healthcare digitalisation promises, some researchers have indicated that not all electronic health systems live up to expectations. For instance, Agarwal, Gao, DesRoches & Jha (2010) reiterated how the anticipated improvements of healthcare digitalisation do not always materialise as expected. Specific statistics by Lorenzi (2008) also revealed that only 28% of electronic medical records systems implementations are successful. Some studies have even suggested that the use of health digital systems, in some cases, have had detrimental effects on efficiency, time savings and patients’ safety (Mihailescu & Mihailescu, 2018). This split literature about the contradictory findings on healthcare digitalisation raises a number of questions about the mechanisms through which these IT-enabled changes are triggered in healthcare organisations (Mihailescu et al., 2015).
In view of the above, Mihăilescu, Mihăilescu & Carlsson (2017) noted that the contradictory outcomes in existing research present an opportunity for researchers to develop theories that can explain the conditions under which certain causal powers that are associated with digitalisation are actualised. In addition to this call, the context of this study, i.e. Ghana, also presents an opportunity for a contextual gap to be filled, since much research has not been conducted in Developing Countries (DCs) in the area of healthcare Information Technologies (IT). The purpose of this study, therefore, is to explain the conditions under which digitalisation occurs in the Ghanaian health sector and their respective digitalisation outcomes. The study draws on the Critical Realism (CR) philosophy and the Realist Social Theory (RST) to answer the major underpinning research questions: what are the generative mechanisms of digitalisation in the health sector of Ghana? How are the varying degrees of digitalisation interpreted and explained in the empirical world? A single case study of a Ghanaian government hospital was adopted for this study. The rest of the paper is structured as follows: Section two reviews prior literature on healthcare digitalisation, with emphasis on DCs, including Ghana. Section three presents the theoretical underpinning of the research. Section four presents the methodologies used. Discussions of the study are presented in section five, and section six concludes with recommendations for future research.

Background Literature

Yoo, Lyytinen, Boland, & Berente (2010a) conceptualised digitalisation as “the transformation of socio-technical structures that were previously mediated by non-digital artifacts or relationships into ones that are mediated by digitised artifacts and relationships. Digitalisation, therefore, goes beyond a mere technical process of encoding diverse types of analog information in digital format (i.e. digitisation), and involves organising new socio-technical structures with digitised artifacts, as well as the changes in the artifacts themselves”. The above conceptualisation clarifies two main points, i.e. (1) the distinction between digitisation as a technical process, and digitalisation as a socio-technical process; (2) the concept of digitalisation involves both material and social aspects. However, the focus of most digitalisation studies have been on digital innovations; where researchers’ primary focus have been on the characteristics and properties, e.g. Yoo et al. (2010a), design and architecture; and have rather paid little attention to the dynamics of organisational changes that represent digitalisation (Mihăilescu et al., 2015). According to Orlikowski (2008), the material aspects of technology remain under-researched in the field of IS. Hence, researching into digitalisation is a good starting point for addressing and recognising the role of materiality of digital technologies. Leonardi (2013) defines materiality in terms of the properties that enable or constrain people’s goals and their interaction with digital technology.

Digitalisation in the health sector is increasingly becoming popular and is gradually being engrained in both local policy and the strategic directions of international healthcare organisations (Bara-Slupski, 2016). A few of the variations used in literature to connote the digitalisation of patients’ health records include Electronic Medical Records (EMR), Electronic Patient Records (EPR), Electronic Health Records (EHR), etc. (Masrom & Rahimly, 2015). EMRs have been in existence since the 1960s; however, its content and scope have changed over time, from isolated applications to vendor-supplied digital platforms shared by healthcare professionals in different clinical locations (Mihăilescu et al., 2017). Despite its increase, the degree of transformation in the health sector has been quite low, and the expected benefits are yet to be fully proven (Agarwal et al., 2010). According to Agarwal et al. (2010), even when digitalisation is considered the panacea for improving healthcare delivery, little is understood about how, and under what conditions, digitisation (i.e. the technical process) achieves digitalisation (i.e. the socio-material process) to generate transformative outcomes (i.e. socio-material structures) that decouples data from its physical sub-stratum (Mihăilescu et al., 2015). Hence, further research is required in this area of IS; since prior research have mostly focused on the enablers and constraints of EMR implementations, e.g. Bedeley & Palvia (2014), as well as factors that influence their adoption in healthcare settings (Mihăilescu et al., 2015).

**Digitalising Healthcare in Developing Countries**

Digitalising healthcare in developing countries is inevitable (Bara-Slupski, 2016). This argument is valid to the extent that, healthcare digitalisation promises to strengthen and transform health systems in DCs, based on evidences observed in the global health systems re-engineering (Tambo, Madjou, Mbous,
Olalubi, Yah, Adedeji & Ngogang, 2016). However, the lack of contextual understanding and systematic approaches to obtaining digitalisation are the major bottlenecks affecting its successful deployment in DCs (Bara-Slupski, 2016). According to Xiao, Califf, Sarker, & Sarker (2013), contexts involving DCs and innovations being imported from developed countries have affected ICT innovations like digitalization in the health sector. More specifically, the role of culture, especially, in the form of ‘embedded traditions’ have also affected technological innovations in DC contexts (Xiao et al., 2013). On the bases of these arguments, this paper posits that context, in the areas of development and use of digital innovations, could be a major contributing factor to the contradictory outcomes of digitalisation in existing research.

In spite of the above, some transformations are still being observed in the convenient, affordable, and timely manner in which medical services are being provided in DCs, as compared with previous health systems which had varying issues of accessibility and care quality (Wesolowski, O’Meara, Tetam, Ndege, Eagle & Buckee, 2015). The reduced burden on healthcare delivery systems, with its consequent improved health outcomes, and the overall quality of life are some evidences of healthcare digitalisation in DCs which cannot be overemphasised. For instance, the proliferation of digital and mobile networks and the increasing adoption of relational databases in hospital settings have promoted digitalisation in DCs. Hence, the positive socio-economic impact of data-driven decision making in healthcare has also been quite explicit in DC contexts (Bara-Slupski, 2016).

**Healthcare Digitalisation in Ghana**

Ghana has over the years demonstrated progress in developing routine health information systems in government hospitals, as well as District Health Information Systems (DHIS), for collecting routine health information (Brown, Austin & Boxerman, 2012). These have been guided by the implementation of a number of policies by the government in its bid to improve care provision and delivery in the country. However, Adjorlolo & Ellingsen (2013) indicate that these policies have not yielded the anticipated success due to the lack of accurate and timely data. In another study, Acheampong (2012) mentioned how the lack of policy guidelines for healthcare digitalisation and data sharing between hospitals and medical staff has affected healthcare digitalisation in Ghana. From other perspectives, (Alvarez, 2012) explained that the challenges encountered in the digitalisation of health records have more to do with commitments from staff and users of the system; as they are not involved and/or considered in the development process. However, most of these challenges discussed above are not particularly peculiar to the Ghanaian context alone, as same is usually experienced in other contexts too, based on extant literature. On the other hand, Asare, Otoo-Arthur & Frimpong’s (2017) assessment of staffs’ computer literacy as the major underpinning challenge for digitalising healthcare in Ghana, due to the lack of confidence in deploying electronic health systems by health managers seem to be more peculiar to the Ghanaian context and some other DCs.

In spite of these challenges, there are some identified unique factors that are shaping the healthcare industry in Ghana whilst supporting digitalisation. Notable among them is the introduction of electronic payments systems through visa and mobile money platforms in most healthcare facilities. Again, the proliferation and increasing use of smartphones and other digital devices which support data and information sharing across various platforms are also shaping digitalisation in the Ghanaian health sector. Affiliations and collaborations between various state institutions such as the Telecommunication, Banking, and Healthcare industries which have allowed the seamless transfer of funds within and between the respective institutions, have also provided a foundation for digitalisation in the Ghanaian health sector.

**Theoretical Framework**

In our bid to explain the differences in the digitalisation outcomes in the Ghanaian health sector, we adopted the Realist Social Theory (RST) from Mihailescu et al. (2015), which also espouses the principles of critical realism. The theory lends itself to providing both an explanatory framework for examining interactions between structure and agency and a theoretical perspective for developing generative mechanisms that produce certain digitalisation outcomes (Mihailescu et al., 2015). Figure 1 gives a visual representation of the theoretical framework adopted for the study.
The RST framework describes the basic elements that are needed to theorise causal paths. From the illustration in Figure 1, three possible digitalisation outcomes are derived: low, medium, and high degrees of organisational transformations. These variations in outcomes are traceable to the interaction among generative mechanisms and their activation in certain conditions. Hence, a higher or lower degree of digitalisation is simply indicative of the level of socio-material interaction between generative mechanisms in the real domain, which also indicates the extent of digitalisation in the health facility under study. The framework, thus, leads us to identify the generative mechanisms of the various degrees of digitalisation, and how each of them produces its respective varying outcomes.

Conclusion

The increasing adoption of healthcare technologies in the Ghanaian health sector raises questions about the conditions under which digitalisation occurs and their respective outcomes. With this background, the study adopted an RST framework from a similar study to assess the Ghanaian context. According to Hong, Chan, Thong, Chasalow & Dhillon (2013), context plays an important role in theorising IS research, especially in cases where IT artefacts (which have different user and system characteristics) are involved. However, the adoption of the generic RST framework in this study presents a basis for future researchers who seek to compare similarities and differences between the digitalisation outcomes of adopted generic models, vis-à-vis novel contextualised models. This study could also be a starting point for future researchers who seek to assess the general and context-specific factors that enable and/or constrain healthcare digitalisation in the Ghanaian health sector.

References


Assessing Healthcare Digitalisation in Ghana


