

Understanding Digital Innovation in National Health Insurance: The Case of Ghana

Completed Research

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Abstract

The purpose of this study is to understand how institutional environment influences digital innovation in national health insurance. A growing body of information systems research on health insurance exists; however, these have focused more on performance and management with less attention on institutional influences. This study employs institutional theory as the analytical lens and qualitative, interpretive case study as the methodology to understand digital innovation and institutional challenges to address the research gap. The findings show that digital innovation can help improve national health insurance service delivery. The critical barriers identified for limiting health insurance include (1) error-prone manual system; (2) silo information system that failed to offer healthcare access portability; (3) absence of national identity system and (4) digital divide across accredited health providers. The findings have implication for research, practice, and policy.

Keywords

Digital innovation, service innovation, institutional theory, health insurance, interpretive case study, developing country, Ghana.

Introduction

The purpose of this study is to understand how institutional environment influences digital innovation in national health insurance. The health system includes health insurance organizations, general hospitals, and pharmaceutical companies with goals of health improvement, equity, responsiveness to legitimate expectations and fair financing among others (Frenk 2010; Olden 2011). National health insurance involves registration and regulation of health insurance schemes, subscriber registration, premium collection, ID card issuance, claims administration and health provider contract management. Health insurance service delivery is a multi-stakeholder activity that seeks to ensure access to basic healthcare mainly to residents in a country. The literature on information systems application in health insurance within the public sector has focused on performance and management generally (Fusheini et al. 2017; Witter and Garshong 2009). Similar examples are worth noting across developing countries such as Uganda (Odokonyero et al. 2017), Namibia (Giedion and Diaz 2010), South Africa (Benatar, Sullivan, & Brown, 2018) and a limited IT perspective on Nigeria (Adesola 2010). However, a characteristic of health insurance service delivery is a lack of functional information technology system, delays in reimbursement, over-billing for drugs and services, long waiting times for members, misappropriation of tariffs (Odusola et al. 2016; Sakyi et al. 2012) and traditional paper-based processes remain dominant. The potential for digital innovation is enormous. The adoption of information technology in healthcare, however, remains slow and inconsistent (Fernández 2017).

Extant literature has theorized digital technologies as being central to digital innovation and therefore significant in facilitating service innovation (Barrett, Davidson, & Vargo, 2015). On the other hand, the literature is focused mostly on medical care and a narrow phenomenon of interest such as electronic health records (Mihailescu and Mihailescu 2017) and big data analytics (Lehrer et al. 2018) within the health system. Much recently we have been challenged to think beyond mere technological developments and consider the broader institutional and societal context of service innovation (Barrett et al. 2015; Makkonen and Komulainen 2018; Negash et al. 2018; Ryu and Lee 2018) and how healthcare organizations can improve patient outcomes and reduce cost (Ghosh, Dohan, & Veldandi, 2018). To fill this gap, this paper extends the current research focus to examine the question of how institutional environment influences digital innovation of member and health provider related services in a health insurance organization. The study employs institutional theory as the analytical lens and qualitative, interpretive case study as the methodology to gain insight into digital innovation in health insurance.

The paper is structured as follows. The next section reviews the literature on digital service innovation and healthcare organization. Then we present a discussion on institutional theory as the theoretical lens for the data analysis. The subsequent two sections present the research methodology and case description, the part after presents the findings, followed by discussions. The final section presents the conclusion.

Digital Service Innovation and the Healthcare Organization

Digital innovation in a broad sense goes beyond the acknowledgment of just the changes brought about by digital technologies and consider the socio-technical context of use and the implications for society at large (Nambisan et al. 2017). Mediated by digitalization, it involves the use of digital technologies (viewed as a combination of information, computing, communication, and connectivity technologies) to migrate manual activities, contents, and processes onto digital platforms (Bharadwaj et al. 2013; Fichman et al. 2014). The effect, aside from potential efficiency gains is to make processes more tailorable and malleable (Fichman et al. 2014). Negash et al. (2018) contend that societal impact is possible through the effective implementation of innovations aimed at improving healthcare delivery. Arising from the acknowledgment within healthcare in general and health insurance in particular, of rising cost, digital service innovation is crucial to healthcare organizations to improve member outcomes and reduce cost (Ghosh et al. 2018). Unfortunately, little exists in the literature to illustrate how all of this might occur. In addition to the non-linearity and the unpredictability of effects that arise due to the interactions, the complexities in the healthcare ecosystem get exacerbated by the mix of different agents, different skill sets and contextual situations with various resources, constraints, motivations, and incentives or disincentives (Negash et al., 2018). Within the same implementing environment, a range of contextual and institutional factors may directly or indirectly influence the implementation process and outcomes.

National health insurance is a social system that guarantees the provision of needed healthcare to health insurance subscribers based on active membership (Adesola 2010). However, limited access to basic health care remains a challenge (Odokonyero et al. 2017). Regarding digitalization, dysfunctional information technology infrastructure hinders provider-insurer communication, leading to inefficient administration, and diminishing quality of care (Odusola et al. 2016). Atinga et al. (2012) writing on the health insurance landscape in Ghana asserts that a significant problem that characterizes the implementation of health insurance is technological setback including much paperwork characterized by inputting of large volumes of client data. In Ghana, by December 2009, the national health insurance rolled out a nationwide integrated ICT programme with the principal objective of providing a robust uniform technology platform for the district mutual health insurance schemes (DMHIS) to operate effectively, efficiently and economically. To date, there has been no formal documented study focusing on institutional barriers to digital innovation of reinstitutionalization of health insurance services in Ghana. This study, therefore, seeks to extend the existing knowledge on digital innovation barriers in health insurance implementation.

Theoretical Foundation: Institutional Theory

Institutional theory (Scott, 2005) asserts that situated actors act within an institutional framework of rules, norms, knowledge and sedimented discourses. The institutional conditions get reproduced in the course of action, but they may also be modified or transformed by intentional or nonintentional activities that involve collaboration based on resource interdependency as well as conflicts rooted in different interests,

interpretations, and worldviews. This article falls within this genre, in that it draws on selected elements from institutional theory to analyze the phenomenon of digital service innovation. Two ways in which institutional theory is given prominence in organizational studies literature are institutional factors and institutionalization process (Mignerat and Rivard 2015). Together they account for the stable and dynamic perspectives of institutions respectively. While the factor approach views the regulative, normative, and cultural institutions as a means of actions in organizations and their environment (Scott, 2001) institutionalization process seeks to explain how institutions emerge, become stable, change and phase out (Mignerat and Rivard 2015). Institutionalization comprises two sub-processes, deinstitutionalization, and reinstitutionalization. First, deinstitutionalization refers to the cessation of previously established institutions due to identified weaknesses (Kwiek 2012). Second, reinstitutionalization relates to the process of introducing a new form of institutional order with new arrangements different from the previous (Currie & Swanson, 2009; Scott, 2014).

From an institutional perspective, digital technologies are more than just a set of material features that functions according to programmed functional rules inscribed within them, but rather, as a product of embeddedness into social institutions (Avgerou 2002). In this context, digital technologies are considered an institution in its own right, one that interacts with other institutions in contemporary society; it is emergent, evolving and embedded (Orlikowski and Barley 2001; Sawyer and Jarrahi 2014). Institutional analysis aid researchers understand how institutions influence the design, use, and outcome of technologies within or across organizations (Orlikowski and Barley 2001). Studies in recent years have adopted an institutionalist perspective to examine IT innovation, development, use and implementation (Mignerat and Rivard 2015).

In this study, deinstitutionalization refers to attempts made at removing constraining institutions within the processes of the NHIS. A characteristic of reinstitutionalization is as an intervention into an existing social order to improve the state of affairs. This study views digital innovation in health insurance as a case of deinstitutionalization of the existing disparate information systems, non-portability of the health insurance scheme, weak claims adjudication, and reinstitutionalization to introduce digital technology interventions. The study further adopts institutions to imply both the formal and informal procedures or practices and the organizations involved in digital service innovation (Srivastava and Shainesh 2015).

Research Methodology

Interpretivist argues that organizations are not static and that the relationships between people, organizations, and technology are not fixed but continually changing. Consequently, interpretive research seeks to understand a moving target (Klein and Myers 1999). Within this paper, we employ an interpretive qualitative case study approach. This approach offers an opportunity to study a subject, for example, one or more organization in-depth, or a group of people, and usually involves gathering and analyzing information. The approach of the interpretive case study is well suited to understanding the phenomenon of this study as it will afford various perspectives of participants to be unearthed and highlight the context as a significant determinant of understanding digital service innovation over time and the influences of context (Walsham, 1995; Myers, 2013).

Data Collection

In line with the interpretive case study tradition (Walsham, 2006) this study obtained data from multiple sources, including interviews, documents, observations, and websites. It included semi-structured interviews with key informants who had knowledge and experience with the digital technology initiatives, its implementation, and outcomes. The key informants' selection was through purposive and snowball sampling (Miles et al. 2014) based on the relevance of their role in understanding the phenomenon of digital service innovation. Sixteen (16) interview participants were selected from the NHIA. The participants include one acting director of MIS, two deputy directors, business system and claims respectively. Others were nine regional ICT coordinators, two datacenter administrators, a database administrator, and a senior manager ICT business system. The timeframe of the data of interest is from 2003 to 2018. Data collection took place from June 2018 to December 2018. Interviews lasted between 45 minutes and two hours, were tape-recorded, transcribed and verified by participants.

Data Analysis

Based on the interpretive tradition, data analysis occurred alongside data gathering (Walsham, 2006). The concepts informing the analysis is from institutional theory, especially deinstitutionalization and reinstitutionalization. From the interpretive analysis perspective, the goal is not to test the theory, but use it as a sensitizing device (Klein and Myers 1999) to allow understanding to emerge from the data. For evidence of deinstitutionalization, the analysis focused on institutional barriers of the general manual systems and how they necessitated the decision to migrate to the digital environment. For reinstitutionalization, the focus was on digital technology interventions made to change the institutional setting and the actual outcome. Where necessary, follow up with the interview participants were undertaken to verify emerging findings or seek additional data following the principle of the hermeneutic circle (Klein and Myers 1999; Myers 2013).

Case Description

Ghana with an estimated population of 29 million as of 2018 and classified as a middle-income country is a developing country in Africa. Health care financing has gone through a chequered history in Ghana since independence in 1957 where all governments have pursued, with varying degrees of success, several policies, and programmes to accelerate economic growth and raise the living standards. The national health insurance scheme (NHIS) was established under Act 650 of 2003 by the Government of Ghana to provide essential healthcare services to persons' resident in the country through mutual and private health insurance schemes. The national health insurance act establishes three types of health insurance schemes consisting of district mutual health insurance schemes (DMHIS), private mutual health insurance schemes (PMHIS), and private commercial health insurance schemes (PCHIS). The mission of the scheme has been towards securing the implementation of national health insurance policy that ensures access to essential healthcare services for all residents of Ghana and recently the drive towards universal health coverage (NHIA 2018).

Before Digital Innovation

At a process level, members registered with the NHIS need to be given some form of identification to be able to visit the health provider to receive healthcare for free. Most of the schemes started with the issuance of manual booklets with member details written in them. In the rural areas, agents would visit a community, register members of a household and return the data to the scheme. At the health provider, a compilation of names was provided by the scheme office for purposes of verifying members who show up with the booklets as a means of validating eligibility for service. The health provider submits a hard copy claim form to the DMHIS for processing the claim after the delivery of healthcare services. After processing, the health provider receives payment notification and picks up a cheque that the health provider presents at a bank for payment.

The DMHIS attempted some level of automation with mix results. The software installed at the scheme offices were on standalone computers with no network connectivity to undertake data entry. Production of the membership ID card was complicated. Within the NHIS, seven different processes and IT systems were in use from health insurance applications procured from local IT vendors.

The implication is that residents registered in two or more schemes simultaneously. Because the systems across the DMHIS were not interconnected, it was easy for health insurance subscribers to obtain NHIS card from multiple district scheme offices across the country. With the growth in membership of the scheme and health service use, came problems with accessing health services. A Director of the scheme recalls below:

The issues of portability being able to move from one community to access healthcare services in another community probably was not envisaged in the design. It was supposed to be a self-contained scheme that would have dealt with all the issues of access to healthcare. The thought of bringing them into one central database was mooted.

The lack of portability and the resulting impact of bloating of the membership database, manual claims processing, inability to effectively monitor and manage service use and attendant cost became a central issue and set the stage for digital innovation within the NHIS.

Digital Innovation Process

A fully fledged IT division that came into force by 2005 had the objective to plan, acquire, deploy and manage ICT solutions that support the processes of the NHIS. The MIS strategy was to cover the acquisition of centrally managed information and communications technology systems that will support the operations of the various DMHIS. The idea was that, to reduce duplications across the scheme, there was the need to have a central database and network connectivity across the country to streamline and unify the process of member registration and claims management. Between 2007 to 2010 the first iteration of digital innovation was started. The different membership databases, the two dominants being Microsoft Access and Microsoft SQL of the 145 DMHIS were migrated onto a centralized Oracle database. All DMHIS were connected using satellite technology to the central data center of the NHIS, including 736 accredited health providers that were connected over a wide area network (WAN) using satellite technology due to being remotely located. Nationwide training was undertaken for all frontline staff at the DMHIS and health provider. The central platform based on Oracle was configured with several modules to address the core business process of membership registration, claims administration, health provider accreditation, and user complaints.

After Digital Innovation

Some benefits were derived from digital innovation; firstly, subscribers of the scheme were able to move from one district to access service. This intervention brought a resolution to the issue of service portability. Secondly, the production of membership ID cards became uniform and centralized. Hitherto, each DMHIS printed its membership cards. Health providers could not verify the authenticity of a subscribers' membership card resulting in service being denied. Thirdly, there was better reporting across business processes such as complaints, claims, accreditation, and finance. Despite these benefits, significant unintended consequences emerged. By 2010, claims volumes had begun to swell resulting from increased enrolment and service use. Provisions made under the unified computing platform for claims administration did not take into consideration the volumes of claims that were going to build up and the resources that were needed to process the claims. The system put in place was not configured to do real-time electronic processing of claims. The result was huge claims processing backlog and delayed reimbursement of health provider claims.

On the one hand, the centralized platform created geographic mobility of access to service but at the same time centralized membership card production. This decision resulted in delays in card production. Subscribers had to wait sometimes more than five months to receive their health insurance cards. To enable them to access health insurance services, subscribers engaged in multiple registrations leading to bloating of the NHIS membership database. Up to 2012, the scheme faced significant data integrity problems as the membership data became unreliable for planning and reporting. A Director of the scheme recounts:

we began to feel the heat that we needed to do something yet again regarding our membership data. Yes, we brought all the DMHIS data into one unified database, yet we still knew this was far more than the actual numbers that we actually have in that there were duplicates in there, people have registered a couple of times. So, we needed to find a way of ensuring that we clean that adequately. The best way we thought we could do that was to introduce biometrics so that unique identifications can be generated.

Resulting from multiple registrations that became pervasive post nationwide ICT implementation, the NHIS set out to implement a biometrics membership system between 2012 and 2015 to clean its membership database and remove the duplicates.

Analysis

This section draws on the institutionalization process approach to analyze the case. First, the notion of deinstitutionalization is used to explain the problems with the existing manual, geographically fragmented and siloed systems as well as other inefficiencies and the reason for their replacement. Subsequently, the notion of reinstitutionalization is used to analyze digital technology interventions and their outcome.

Process of Deinstitutionalization

From the case description, the focus of deinstitutionalization was to remove institutional barriers that made the existing manual, geographically fragmented and siloed systems problematic resulting in service delivery nightmare for health insurance members across the country. Such institutions included the issuance of manual booklets and lack of a lasting solution to membership card issuance, manual processing of claims leading to delayed claims payment, and non-uniform registration processes due to the use of multiple platforms. Others were, inability to effectively monitor and manage service use and attendant cost, inability to gather timely data on the prevalence of diseases/illnesses in different parts of the country leading to suboptimal managerial decision making and non-portability of service entitlement for members (i.e., difficulty in accessing health facilities nation-wide).

For example, when a user accesses health services under the national health insurance at an accredited health provider, diagnosis and treatment information are written on a hard copy claim form. After consulting with patients, the health provider will create a batch of the claim forms usually in their thousands. This batch is then transported and submitted to the NHIS for fulfillment (confirm volume and value of claims received), vetting (adjudicate claims for eligibility, benefits package, treatment, diagnosis, tariffs, and prescribing levels), all a paper-based and manual process.

Notwithstanding the use of computers by the DMHIS, the absence of interconnectivity among the standalone applications from multiple local software vendors, manual processes across core business activities persisted leading to management of enormous volume of paper, delays in claims submissions, processing and payment as well as difficulty in detection of fraud and abuse. The adverse effects of these shortcomings rendered the schemes operations and access to service ineffective and fraught with serious challenges. Consequently, the focus on digital innovation was to remove such barriers.

Process of Reinstitutionalization

After identifying the culture of inefficiencies in the existing manual and geographically fragmented systems and processes as candidates for deinstitutionalization, the reinstitutionalization process commenced putting in place the digital infrastructure to improve service delivery and operations of the NHIS. The reinstitutionalization process introduced digital technologies that consolidated the siloed and disparate systems under one platform creating a standard national membership ID card. With the new cards, it became easier for health providers to validate members for service. Also, the reinstitutionalized membership system meant that health insurance members were no longer restricted to a community in accessing health services. The centralized database facilitated universal portability and quality of service at the point of service delivery.

Manual processing and paper-based claims administration were also reinstitutionalized. The electronic claims system was intended to remove the existing cultural practices by digitalizing manual processes under which vast volumes of paper claims were being managed. Notwithstanding the intentions to electronically process claims, the study observed that this has not succeeded in completely reinstitutionalizing the existing manual claims and paper-based culture. A parallel process of electronic and manual claims processing is still in use. Consequently, the intended electronic claims became partially reinstitutionalized at data entry into an electronic claims application after manual vetting of claims. Some reasons for this partial reinstitutionalization are health provider apathy toward automation, cost of converting paper claims to digital for electronic processing and weak internet connectivity across the country.

Discussion

In line with the research focus of understanding how institutional environment influences digital innovation in national health insurance, this section discusses the research findings regarding the outcomes of the digital innovation interventions that took place. Findings show that, notwithstanding the digital service innovation attempt towards improving health insurance service delivery, problems persisted.

Limitation of Existing Law

Several reasons account for this. First, the lack of portability across the scheme could have been driven by the understanding that was derived from the health insurance policy that these were “mutual schemes”. It

was expected that active participation would be limited to residents within communities attached to a DMHIS. Second, the law failed to anticipate the geographical mobility of citizens. Indeed, the original law, Act 650 of 2003 have been replaced with Act 825 of 2012 to bring the schemes under one administration. The issue of portability being able to move from one community to access services in another community was not envisaged in health insurance policy design. This paper argues for the need of the regulative institutions to consider the generative capacity of digital innovation and the significance of service innovation. The view on the perceived limitation of the existing law is echoed by (Agyepong et al. 2016) asserting that because of concerns about the quality of management and control, the system was reformed in 2012 with the passage of a revised national health insurance law (Act 852).

Non-Use of National Identity System

Improving citizens' access to healthcare services requires that the means of obtaining membership, renewing, and the verification necessary to access the service was not fraught with challenges. To a certain degree, subscribers (clients) of healthcare organizations services differ from customers in other service sectors. For instance, they are usually sick and under stress, and reluctant for 'unwanted' or 'annoying' healthcare services (Berry and Bendapudi 2007). Thus, even though several attempts were made to address member registration, renewal and access to health services through deinstitutionalization and reinstitutionalization, the absence of a national identity system as a point of reference in identifying residents to be enrolled for access to healthcare constrained the deinstitutionalization process. A working national identity system of residents and properties would have enabled the NHIS leapfrog institutional and technological barriers in dealing with membership data issues. The authors argue that a critical first step for any nation is the identification of who and where its citizens are, a base infrastructure from which other national investments will emerge.

Digital Divide Across Accredited Health Providers

Electronic claims processing has been deinstitutionalized and reinstitutionalized; however, this core health insurance activity is still not fully digitalized as manual processing is in use side-by-side with electronic claims with manual processing representing the bulk. The scheme has not achieved what it set out to with the attempts at digital innovation of claims processing. The scheme set out to achieve full electronic claims submission and processing of about 4000 health providers. In 2017, about 100 accredited health providers were onboard the e-claims platform. To put this in context, more than sixty percent of accredited health providers are CHPS (Community-Based Health Planning and Services) healthcare post. These are primary level rural health facilities and therefore do not have the means to undertake electronic claims. The other 1500 are clinics and above, and the top 300 are up to the primary hospital level. Across these various strata of healthcare facilities are health provider apathy towards automation, lack of IT funding at health provider site, lack of IT skills at the health facility, weak internet connectivity across the country and slow adoption of a hospital information system. Srivastava and Shainesh (2015) paper "bridging the service divide" conceptualizes the digital divide through desired outcomes (a service perspective) as a service divide, and propose that, in the context of developing countries, this conceptualization is more effective for better equipping the society with basic capabilities such as healthcare by leveraging ICT. The paper further posits that "ICTs can be leveraged to bridge the service divide to enhance the capabilities of service-disadvantaged segments of society. However, such service delivery requires an innovative assembly of ICT as well as non-ICT resources" (Srivastava and Shainesh 2015, p. 245).

Conclusion and Implications

The purpose of this study was to understand how institutional environment influences digital innovation in national health insurance. The findings show how a major digital infrastructure initiative succeeded in offering accessibility and uniformity to a manual and disparate system promoting centralize information sharing and improve health insurance service delivery. Critical barriers identified include the pervasive and error-prone manual system, digital divide across accredited health providers and the absence of a national identity system that enhances organizations ability to leapfrog institutional and technological barriers. The legal institution can also act as a barrier if the generative capacity of digital technologies is not thought through and the necessary provisions made.

The study contributes to research, practice, and policy. For research, the study reveals institutionalized manual and paper-based activities and non-use of a unified computing approach to national health insurance service delivery, as some of the critical barriers to digital service innovation. By identifying these institutional barriers, this study extends existing knowledge on barriers to national health insurance in an African country context. The paper also demonstrates the usefulness of the institutionalization process involving deinstitutionalization and reinstitutionalization as relevant concepts for understanding digital service innovation in national health insurance to provide insight into the barriers of digital service innovation.

Regarding practice, the findings show that health insurance practitioners and managers should not only address technical issues but also focus on deinstitutionalizing existing practices that can serve as barriers to digital service innovation. Concerning policy, the findings suggest the need for developing country governments and policymakers to institute frameworks to drive and deepen digital service innovation as a vehicle for the institutionalization of improved service delivery in healthcare. The limitation of the study lies in its single country case study approach. Nevertheless, from the perspective of interpretive research, which does not seek statistical generalization but focuses on contextual and theoretical generalization, the findings can be generalized to developing countries that share a similar health insurance context with Ghana.

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