



USE OF GROUNDED THEORY METHODOLOGY IN E-HEALTH IMPLEMENTATION IN DEVELOPING COUNTRIES: THE KENYAN HEALTHCARE SECTOR

Caroline Boore

Ph.D. Candidate, School of Business, University of Nairobi, Kenya

Njihia M James

Dean, School of Business, University of Nairobi, Kenya

XN Iraki

Senior Lecturer, School of Business, University of Nairobi, Kenya

Abstract

For information system research to maintain most significance in emerging areas of the socio-technical field such as healthcare sector researchers need to adopt a new methodology. A new methodological alternative such as grounded theory building research, where the emerging theory helps explain, in conceptual terms, what is going on in the substantive field of research. Other methods have the effect of forcing preconception through the transfer of erroneous theoretical assumptions upon the emerging phenomena. A Grounded Theory approach may overcome these problems by providing a window that does not bias surface with a priori suppositions and does not push towards a selection of predetermined theories from which the researcher must elucidate the socio technical phenomena. Grounded theory is typically offered as an inductive approach, whose objective is to build and develop theories of an intricate nature based on empirical evidence. The implementation of information technology (IT) and domain-specific e-health is, amongst other things, seen as potential leverage in responding to problems concerning the healthcare sector. The existing theoretical frameworks for e-health implementation in developing nations are not holistic and only address few aspects of e-health implementation. Indeed the theoretical frameworks that are in place may not show the real context for many developing countries for the implementation of e-health systems thus there is a need to explore other methodologies of carrying out such healthcare research. A data driven approach like grounded theory approach would be appropriate to unearth this phenomenon of e-health implementation in developing countries. The paper used secondary data sources to evaluate the impact of grounded theory methodology in implementing information systems in the healthcare sector.

Key words; Grounded theory, pragmatism, e-health implementation

Introduction

In recent years, the rates of implementation and diffusion of information and communication technology (ICT) have become important indicators of national development. Many developing countries have put technological innovation on top of their national development agenda and invested heavily into ICT. For example in the healthcare sector the implementation of ICT commonly referred to as E-health is perceived as the main driving force in the unfolding healthcare reforms in many developed and developing countries. E-health appears to offer a panacea for facilitating the necessary transformation for healthcare. According to Eysenbach (2007) e-Health is the use of ICT, especially the Internet, to improve or enable health and healthcare. E-health consists of applications that support disease prevention, patient diagnosis, patient management and care. These applications include electronic Medical Records (EMRs), Telemedicine, Health Knowledge Management, Consumer Health Informatics (CHI), M-Health and Healthcare Information Systems (HIS). WHO (2013) observes that the use of ICTs in health is not merely about technology, but a means to reach a series of desired outcomes, such as: health workers making better treatment decisions and hospitals providing higher quality safer care.

Research problem

The healthcare sector in Kenya is transiting towards a new paradigm shift where services are now devolved to the counties. This requires new ways of thinking and managing the sector to enhance service delivery. The health care sector in Kenya is recognized as having lagged behind other industries, for example the financial sector, in the use and implementation of new information technologies (Juma et al., 2012). According WHO (2013) the sector has several hurdles, among them the rising cost, an ageing population and demand for quality healthcare services. There is therefore an urgent need to identify and implement solutions that can effectively improve healthcare delivery. This can be achieved by executing strategies that close the healthcare service delivery gap by harnessing ICT as a key driver for improved outcomes. E-health is a globally proven method of achieving this transformation, and its successful implementation would provide a unique opportunity for improved medical care with the potential for long term benefits and sustainability. The theoretical frameworks that are in place may not show the real context for many developing countries for the implementation of e-health systems thus there is a need to have a data driven approach. Grounded theory approach may assist unearth the issues underlying e-health implementation in developing countries.

Methodology

Literature review was employed in this study. Abstracts from research journals and health related databases (among others) were examined. Other research papers of scientific publications were also examined to provide a detailed understanding of grounded theory methodology.

Research paradigm

Philosophical debate on how to conduct Information systems research has been the focus of much researcher's attention (Mingers, 2001; Weber, 2004). Among the important steps in the process of research design is consideration of the assumptions underlying how we perceive the world, and reinforced by those around us and the community of practitioners (Denzin & Lincoln, 2011). Mostly, the beliefs held by the researcher affect the way in which research is designed, data is collected and analysed and the outcomes of research are presented. Therefore, the perception of these assumptions by the researchers, especially at the phase preceding the selection of research approach, is an important step that will broaden the horizon for the perception of knowledge and acquiring it on the one hand, and define the role of researcher in the research process, identify the real course of research and distinguish it from other research tracks on the other hand.

Weber (2004) emphasises that the realisation of these assumptions, whether explicit or implicit role in playing a vital role in guiding the process in the IS research, and thus reflects in the research outputs in a positive way. Moreover Denzin & Lincoln (2011) notes that in practice, these assumptions represent at a philosophical level; basic beliefs about the world we live in, which constitutes along with the social level;

guidelines on how to conduct research and the technical level; methods and techniques used to conduct research, the term paradigm. The term paradigm 'was first introduced by Thomas Khun in his book, *The Structure of Scientific Revolutions* in 1970. Neuman, (1991, p. 57) provided a useful definition of a paradigm as a framework or a set of assumptions that explain how the world is perceived where 'the paradigm of a science includes its basic assumptions, the important questions to be answered or puzzles to be solved, the research techniques to be used, and examples of what scientific research looks like'. Kuhn (1970) first used paradigms in the context of a framework to understand inquiry. He sees paradigms as... 'A set of values and techniques which is shared by members of a scientific community, which act as a guide or map, dictating the kinds of problems scientists should address and the types of explanations that are acceptable to them'(Kuhn, 1970, p. 175). Denzin & Lincoln (2011) laid down the framework of the various assumptions underlying the social science research. This framework has been used to determine the theoretical and philosophical assumptions underlying and supporting this research. The framework has been presented on the form of a matrix consisting of two dimensions or sets of assumptions about social science and society. Furthermore, the social sciences dimension is based on a subjective/objective dimension. This includes four assumptions related to the social science research, namely ontological, epistemological, methodological assumptions, and assumptions about human nature.

Ontological assumptions are concerned with the nature of the world and human being in the social context (Bryman, 2001). There are many assumptions to see the world from the outside. In positivist paradigms, however, ontology focuses on the independence of the social phenomenon of other factors. The world is one and there is no other perception. While the focus of interpretive paradigms is that the world has different meanings with respect to social phenomena. This means that the change in one factor may affect the change in the social context itself, and therefore different researches can reach different conclusions for the same observation. Critical theory paradigms see the world as something that has to be changed. It involves the critique and changing social phenomena based on the interrogations of the social phenomena and individual alike. In pragmatism, paradigms are not seen as abstract entities with timeless characteristics but rather, paradigms are perceived as ever changing belief systems (Morgan, 2007). Epistemological assumptions are concerned with the ways to perceive and acquire knowledge (Bryman, 2001). In positivist paradigms, knowledge is perceived as how to investigate the social world as one of the natural sciences. Hypotheses are tested through empirical approaches. Results should be objective through scientific methods. While the knowledge for interpretive paradigms, is to investigate the phenomena in many ways. Moreover given that the social context is different from the natural sciences, the investigation of social phenomena can generate many explanations. In critical theory paradigms, knowledge is the result of practice. They are ways of doing research, rather than ways of defining the ontology and epistemology underpinning research in this case in the healthcare sector. Thus pragmatism is suggested as a suitable paradigm for research into e-health implementation as opposed to other paradigms.

Pragmatism paradigm

Pragmatism abandons the traditional perception that ontology and epistemology are foundations upon which social scientific inquiry should be based, because the concepts of ontology and epistemology themselves have been empirically conceptualised (Morgan, 2007). For pragmatists, the existence of so many types of ontologies (such as realism, idealism and dualism) and epistemologies (such as interpretive, constructivist and subjectivist) is evidence that they are ideals rather than objectively true concepts (Scott and Briggs, 2004). Therefore, in pragmatism, paradigms are not seen as "abstract entities with timeless characteristics" (Morgan, 2007, p.61). Rather, paradigms are seen as ever changing belief systems. They are ways of doing research, rather than ways of defining the ontology and epistemology underpinning research in this case in the healthcare sector (Kuhn, 1996; Morgan, 2007). Methodologies are therefore not constrained by ontologies and epistemologies, so qualitative, quantitative or mixed methodologies are permitted because all act as tools for empirical inquiry. The pragmatic approach hence moves away from the theoretical starting point for research. It instead endorses the use of the methodologies that are the most suitable for answering the research questions and addressing the

phenomenon under study. The focus is on producing knowledge for problem solving, and whether the knowledge produced is useful for practice (Corbin and Strauss, 2008). A tenet rejected by pragmatists is that of an Archimedean platform, i.e. an objective or context free claim to scientific 'truth' (Dewey, 1917). Similarly, the 'spectator theory of knowledge', which suggests there is a world ready to be discovered by a passive observer, is not accepted. Pragmatists therefore argue that absolute objectivity and certainty cannot be attained in research. Rather, 'truth' is what is known at the time a provisional consensus that is developed about the research topic, which later evidence could show is flawed or wrong (Maxcy, 2003; Scott and Briggs, 2009). Related to the rejection of certainty, pragmatism also postulates that everything that is known is affected by a certain level of subjectivity. Knowledge discovered through empirical inquiry is inextricably linked to the construction of knowledge in the human mind (Bryant, 2009).

However, pragmatist understanding of reality entails two theoretically and methodologically significant consequences: not only is pragmatism one among a number of 'philosophies of the flux' (Dewey 1917) but it also defines reality as being made by and experienced only through human activity. Concisely: reality is nowhere else but inactive experience, i.e. in action. 'Reality in itself, or in its uninterpreted nakedness, is a pragmatically meaningless notion, for it is a notion. Dimitri Shalin gives us an impressive picture of the pragmatist perspective on reality: Pragmatist philosophy conveys an image of the world brimming with indeterminacy, pregnant with possibilities, waiting to be completed and rationalized. The fact that the world out there is 'still' in the making does not augur its final completion at some future point: "the state of indeterminacy endemic to reality cannot be terminated once and for all. It can be alleviated only partially, in concrete situations, and with the help of a thinking agent. The latter has the power to carve out an object, to convert an indeterminate situation into a determinate one, because he is an active being" (Shalin 1986: 10). Critics of pragmatism may claim that one cannot distinguish beliefs that are useful but true from those that are useful but false, because there is no posited way of knowing absolute truth. Scott and Briggs (2009) argue that it is irrelevant whether something is true or false because if a community believes something to be 'true', this will govern their behaviour regardless of how it compares to an unreachable objective truth. The belief that is held and acted upon by people is more important, and this is what can be found via pragmatic inquiry. Pragmatist research focuses on what works to meet the particular needs of the researcher instead of restricting the researcher to specific methods in answering the research question. It allows the researcher to use the most appropriate method (multiple methods) to understand the problem being studied (Brewer & Hunter, 1989)

Grounded Theory and pragmatism

Grounded theory (GT) is typically presented as an inductive approach, which aims to build and develop theories of a complex nature based on empirical evidence. Grounded theory was first introduced by two American sociologists, Barney Glaser and Anselm Strauss in their book *The Discovery of Grounded Theory* in 1967. It was developed from both nursing and sociology disciplines. Glaser's definition of grounded theory is "a general methodology of analysis linked with data collection that uses a systematically applied set of methods to generate an inductive theory about a substantive area" (Glaser, 1992, p. 16). With Grounded Theory, the aim is to create a theory that has practical application (Corbin and Strauss, 2008). The philosophy behind Grounded Theory comes from pragmatism and symbolic interactionism, a school of thought that assumes that a person does not react to another person's actions, but the meanings they themselves ascribe to the other person's actions. Strauss and Corbin (1998) more over suggest that qualitative and quantitative methodologies are simply instruments in developing useful theories, and that one mode does not have primacy over the other. They state that "researchers in human and social sciences are operational pragmatists. The more flexibly scientists work or are allowed to work, the more creative their research is apt to be" (Strauss and Corbin, 1998, p.30). Grounded theory has evolved over the years. This has led to a split between Glaser and Strauss on the nature of the methodology and how to be applied. Charmaz (2014) argues that the Glaserian version focuses on the need for restraint to maintain discipline, integrity and impartiality of the methodology, which allows for

the phenomenon being studied to inform theory, while the Straussian version focuses on the active participation of the researcher in the phenomenon studied, as well as the exploration and use of all possibilities in the data collected (Strauss and Corbin, 1998).

Grounded Theory is suitable for e-health research firstly because of its intuitive appeal. At the outset of this argument it is imperative to note that GT is not limited to a specific field, discipline or any type of data (Glaser, 1992). GT has informed different areas and has demonstrated a wide range of applicability (Morse, 2009). Myers (2009) argued that GT has an “intuitive appeal” (p. 111) for researchers because it permits them to get “immersed” (p. 111) deeply within the data. This immersion is translated practically in the constant comparison, coding and memoing approaches to data analysis. Charmaz (2006) supported this notion and asserts that GT provides novice researchers with the needed principles and “heuristic devices” to “get started, stay involved, and finish the project” (p. 2). Charmaz (2006) added that while other qualitative traditions permit investigators to treat data as they please without clear directions on how to proceed, GT provides “explicit guidelines” (p. 3) that direct researchers about how to carry out their research. For many pragmatic researchers, GT is very useful in answering their questions, enlightening their thinking and for providing them with reassurance when hesitations arise during the research process in this case exploring e-health implementation issues in the healthcare sector.

Secondly GT has the potential to conceptualize. GT is unique in its ability to generate concepts by utilizing the logic of constant comparison and frequent memo writing (Glaser, 1978). This specific approach to theory development is derived from the continuous interplay between data collection and data analysis (Myers, 1997). Glaser (1978, p. 3) argued that concepts have “broadening power” and are “easier to remember” as they encompass a myriad of incidents, which facilitates the transferability of these concepts into unfamiliar contexts. Furthermore, Glaser (1978) added that there is “much value in the conceptualizing and conceptual ordering of research data” (p. 3). Later Glaser (1998) reiterated a similar position reflected in his statement, “By far the most exciting use of GT over the last ten years is its legitimation of concept generation” (p. 133). Strauss and Corbin (1994, p. 274) identified that “the major difference between this methodology GT and other approaches to qualitative research was its emphasis on theory development”.

Finally GT has a systematic approach to data analysis. A notable advantage of the GT method is in its systematic approach to data analysis. Glaser (1978) defined GT as “systematic generating of theory from data that itself is systematically obtained from social research” (p. 2). Strauss and Corbin (1990) mirrored this definition in their statement that GT is “a qualitative research method that uses a systematized set of procedures to develop and inductively derive GT about a phenomenon” (p. 24). Other qualitative research methods frequently depend on the use of broad principles rather than the systematic approach, leading to difficulty in their application and interpretation (Myers, 2009). This systematic approach of analyzing data is beneficial in judging, generalizing and comparing the results of GT research (Strauss & Corbin, 1990). We contend that this systematic approach to data analysis provides for rigor and ensures trustworthiness in the emerging theory. The theory, which is grounded in the data, therefore forms a basis for further research to extend current knowledge, allowing substantive theories to become more formal theories, meaning they can be applied to wider population. An assumption about the world made by Corbin and Strauss (2008) is that it entails a multitude of factors that interact in complicated and unexpected ways.

Charmaz (2006) supported this argument by differentiating between accidental discovery (serendipity) and systematic exploration that is based on the epistemological and ontological assumptions of the explorer. The latter is sustainable as it is a “broad-ranging, purposive, systematic, pre-arranged undertaking” (p.4), during which researchers actively and purposefully place themselves in a position to seek for “discoveries” (p. 4) instead of continuing their usual research and passively waiting for the “aha” moments or serendipity to strike (Charmaz 2006). Systematic procedures such as simultaneous collection and analysis of data and the constant comparative logic and theory that emerges from data provide GT with rigor that is not accounted for in other qualitative approaches (Charmaz, 2006). Additionally, being systematic provides the researchers with enough evidence to support their claims (Myers, 2009, p. 111). Glaser and Strauss (1967) extended this thought further by directing the researcher to check for the

relevance, fitness, workability and modifiability of the discovered GT which attracted researchers and kept them engaged. Charmaz (2006) added that “by adopting GT methods you can direct, manage, and streamline your data collection and, moreover, construct an original analysis of your data” (p. 2). The method facilitates the generation of theories of process, sequence, and change pertaining to organizations, technology, positions, and social interaction (Glaser and Strauss, 1967).

Discussions

Why Grounded theory methodology in e-health implementation research

In order to ground further understanding of e-health implementation in a developing country context, information system theories: Technology Organization Environment Model (TOE) and Actor network theory (ANT) are evaluated. However ANT is critiqued for its inherent limited ability for providing empirically verifiable evidence by offering a rich terminology. Indeed ANT is too descriptive and fails to come up with any comprehensive suggestions of how actors should be viewed, and their actions analysed and interpreted especially in healthcare sector. On the other hand TOE has been criticized as being too general and not a good model of explaining complex issues such as e-health implementation in developing countries. Thus given the intricacy and the fast-moving ever-changing field of the healthcare field and its distinctive occupational dynamics, the existing information systems theories, may not be an appropriate methodology for explaining e-health implementation, hence it is useful to adopt a theory building approach in order to explore this phenomenon in detail. This will give the researcher a lucid and more precise picture into the key area of healthcare operations (Fernández and Lehnmann 2005). A grounded theory methodology allows researchers to develop theories from the empirical data. This means that instead of getting the data on the phenomenon through the preconceptions of the researcher, which are often not comprehensive, the methodology is able to get the data directly from the real context of the phenomenon (Bryant, 2002; Fernández, 2005). Moreover, encoding as one of the techniques that characterise this methodology would assist the researcher to handle the complexities of the various unstructured social contexts (Bryman, 2001), and therefore, enable the researcher to address the vast amount of data collected, theoretically and systematically formulate the theory.

Indeed Grounded Theory has turned into one of the most preferred qualitative approaches for many investigators in various disciplines. In the past decade, the usage of Grounded Theory methodology has seen a growing interest among IS researchers (Orlikowski, 1993; Bryant, 2000; Lehmann, 2010). For instance, Orlikowski (1993), who received MIS Quarterly's Best Paper Award for 1993, used grounded theory to come up with a theoretical model for the adoption and use of computer-aided software engineering (CASE) tools in various organisations. She justified the use of the approach as it permits focusing on the contextual and procedural elements on the one hand, and allows focusing on the action of main players associated with the elements of organisational change that are often not addressed in IS research. Grounded theory differs from other qualitative approaches, as it permits the development of theories straight from the raw data. In this approach data collection and analysis is done in a logical manner, and maintains the data to be grounded, rather than forcing data to fit with existing theories. Moreover, the theory does not look out to formulate and test hypotheses based on earlier research, but rather seeks to make the research questions general, open and flexible. Furthermore Grounded theory, and through what is known as theoretical sensitivity, allows the researcher conduct a comparative analysis of empirical data collected in order to identify similarities and differences between the categories and its properties in an attempt to search for common patterns in the data. This is later known as conceptual elements of a theory (Glaser and Strauss, 1967).

However, comparative analysis of the data that is collected will continue until disclosure of all potential categories, the impossibility of finding new themes in the data, and most importantly, validation of the theory. This is known as theoretical saturation, while the process by which the collection and sampling is done is known as theoretical sampling (Glaser and Strauss, 1967). According to Bryant, (2002) there is a

clear difference between the terms of statistical or random sampling and theoretical sampling. This difference was also confirmed by Glaser and Strauss (1967, p.24) by saying that “the purpose of theoretical sampling is not to get a random sample or a representative of the population, but to identify groups of people that have certain characteristics or conditions such as those that surround the social phenomenon to be studied”. The principle of grounded theory methodology lies in the issues of coding and categorisation, where the researcher can see the gradual appearance of the theory. In other words, the theory is gradually evolving from experimental data through the constant comparison method to analyse the data. Glaser and Strauss summarizes the phases of the constant comparison method as follows: “first, comparing incidents applicable to each category; second, integrating categories and their properties as the coding continues, the constant comparative units change from comparison of incident with incident to comparison of incident with properties of the category that resulted from initial comparisons of incidents; third, delimiting the theory, and finally writing theory” (1967: p. 105). In light of the above, Glaser and Strauss (1967, p.92) emphasised the importance of collecting memos for all probable categories, as it provides a reference point if a researcher wanted to discuss issues related to the emerging theory. In addition “the researcher can formulate hypotheses about relations between categories and their properties through collecting memos”. Practically, this may perhaps help the researcher to identify the data behind the hypotheses, filling a gap in the evolving theory, or to provide explanations about the emerging theory.

Grounded Theory differs from other qualitative methodologies, as it allows the development of theories directly from the raw data, data collection and analysis in a systematic manner, and maintains the data to be grounded, rather than forcing data to fit with current theories thus fostering creativity (Chamaz, 2014). GT does not start with testing an existing hypothesis, but uses the empirical data to generate concepts and theories (Glaser, 1978). In other words, it does not bias emergence the theory with a priori assumptions (Glaser, 1978). To ascertain this emergence, investigators are encouraged to avoid “preconceived hypothetical data” (Myers 2009, p. 108), a suggestion that can be seen as an advantage to enhance creativity and trigger the development of new ideas. Furthermore, GT encourages the researcher to move through a process of discovery whereby themes and interpretations naturally emerge from the data. In essence, GT allows the research to derive meaning from the data and analysis using creative, inductive processes; it allows for the emergence of original findings from the data (Charmaz, 2006). Strauss and Corbin (1994, p. 274) identified that “the major difference between this methodology [GT] and other approaches to qualitative research was its emphasis on theory development”.

Secondly GT has a rich data depth and richness. The approach used by grounded theorists to collect rich data is another advantage that is substantial (Charmaz, 2006). Rich data will make the “world appear anew” (Charmaz, 2006, p. 14) because the richness of the data will provide the researcher with concrete and dense fabric to construct a thorough analysis of the data in addition to aiding the researcher to go beneath the surface of the participants’ social and subjective life (Charmaz, 2006). Charmaz (2006) contended that the research adventure starts with “finding data” (p. 14). Data will unearth the context and structure of the participants’ lives in addition to divulging their feelings, views, intentions and actions (Charmaz, 2006). In order to obtain rich data, researchers are expected to seek thick descriptions (Corbin and Strauss (2008) through writing “extensive field notes of observation” (Charmaz, 2006, p. 14), gathering thorough narratives from interviews (p. 14).

GT methods provide the tools for “making sense of the data” (p. 15) and refining it to generate insight into the phenomenon. Rich data must provide the researcher with enough background about the phenomenon under study. Moreover, rich data must “reveal what lies beneath the surface” (p. 19) and must expose any changes over time. Rich data will enable the researcher to develop analytic categories that facilitates the comparison of data in order to percolate new ideas. Charmaz (2006) espoused that GT can be constructed with different types of data depending on the research topic and questions. The researcher’s aim is to enter the participants’ lives to see it from inside which eventually illuminates the “unobtainable views” (Charmaz, 2006, p. 24) that outsiders usually assume about the world. Utilizing the

logic of GT forces the researcher to go back to the data and forward into analysis to gather further data and to refine the “emerging theoretical framework” (p. 23) which offers the researcher a “fresh look and creating novel categories and concepts” (p. 33). The inductive approach relies on the researcher systematically collecting, coding, categorizing and analyzing data to derive the theory that explains the phenomena in this case implementation of e-health in the healthcare sector.

Limitations of grounded theory

Grounded theory is criticized as being very intricate and laborious methodology due to the tiresome coding process and memo writing as part of the analysis (Charmaz, 2006; Fernández, 2005). This can be made easier by use of specialized software such as NVIVO to help speed up coding and analysis of data.

Conclusion

The healthcare environment is intricate and multifaceted thus to fully understand it conceptually requires grappling with many interweaved and overlapping issues. These issues can best be unearthed by using a data driven approach that is grounded theory methodology. Thus the direction of healthcare research should be geared towards utilization of the approach in order to comprehend complex issues better. The outcome of such a study would be a generation of a theory that is grounded from data. This kind of a theory would be more context specific as opposed to testing existing theories that force certain preconceptions. In contrast grounded theory allows open exploration depicting development of concepts and showing their relationship thereby coming up with a substantive theory that may better explain the problem under study.

Future research

The current research mainly concentrated on grounded theory methodology as an alternative to other approaches in Information Systems research. Further research may be done to find out how compatible grounded theory approach is with other methodologies. The method should be explored further to establish how it fits as a mixed methodology in IS research.

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