Chapter 51

ANT Perspective of Healthcare Big Data for Service Delivery in South Africa

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ABSTRACT

In South Africa, there has been for many years challenges in how healthcare big data are accessed, used, and managed by facilities, particularly the small health facilities. The challenges arise from inaccuracy and inconsistency of patients' data and have impact on diagnoses, medications, and treatments, which consequently contributes to fatalities in South Africa, particularly in the rural areas of the country. The problem of inaccuracy and inconsistency of patients' data is often caused by lack of or poor analysis (or analytics) of data. Thus, the objective of this research was to understand the factors that influence the use and management of patients' big data for healthcare service delivery. The qualitative methods were applied, and a South African healthcare facility was used as a case in the study. Actor network theory (ANT) was employed as a lens to guide the analysis of the qualitative data. Based on the findings from the analysis, a model was developed, which is intended to guide analytics of big data for healthcare purposes, towards improving service delivery in the country.

1. INTRODUCTION

Due to the essentiality of healthcare, delivery of quality service is always crucial (Cresswell, Worth & Sheikh, 2010). However, there have been many cases of wrong diagnosis and prescribed medications by health facilities in many countries, including South Africa (Lewandowski et al., 2017; Fico et al., 2016). The problems are linked to many factors including analysis of patients' big data (Sacristán & Dilla, 2015).

From a healthcare standpoint, the characteristics of big data are volume, variety, and velocity (Priyanka & Kulennavar, 2014). The unprecedented types, speed, and sources of patients' big data do sometimes create challenges and limitations in its accessibility, quality, use, and management in providing and receiving healthcare services (Ganjir, Sarkar & Kumar, 2016; Nativi et al., 2015).

Big data that are for specific purpose and usefulness require harnessing its capabilities, from both technological and human standpoints. Thus, analytics tools are needed to analyse diverse big data types, at velocity, and real-time (Priyanka & Kulennavar, 2014). However, big data analytics can be a disruptive phenomenon, from privacy and standardisation perspectives (Bello-Orgaz, Jung & Camacho, 2016). This is attributed to largeness and complexity of big data, which analytics tools have so far found difficult to address at socio-technical levels (Ularu et al., 2012). In South Africa, this has been a serious challenge for many health facilities (Ruxwana, Herselman & Conradie, 2010).

There have been gaps in patients' data which impedes progress in the South Africa healthcare environment (Coovadia et al., 2009). Thus, Mgudlwa and Iyamu (2018) suggest that the integration of various datasets is essentially relevant and useful to healthcare service providers. From South Africa viewpoint, Mayosi et al. (2012) argue that good-quality data in a timely manner is always needed due to the rapid changes that happen in the health environment. This is contrast with the on-going improper coordination and management of patients' data, which leads to incorrect diagnoses and treatments (Ruxwana et al., 2010).

Based on the challenges established above, this study attempts to answer the question: What are the factors that influence access, use, and management of healthcare big data in the South African health facilities? In answering this question, it was necessary to examine the actors (personnel and technologies) that are involved, their roles in accessing healthcare big data, and how the activities involving big data are translated or manifested. Thus, moments of translation from actor-network theory (ANT) (Callon, 1986) was selected to guide the analysis. The core tenets of ANT are actor, network, and translation (Latour 2005). Iyamu and Roode (2012) describe ANT as a theory which focuses on the interaction between humans and technology.

This article is structured into seven main sections. The first section introduces the entire article, followed by sections covering review of literature about actor-network theory and big data, respectively. The research methodology is discussed in the fourth section. The fifth and sixth sections present the data analysis and discussion of the results, respectively. The conclusion is drawn in the last section.

2. ACTOR-NETWORK THEORY

Actor-network theory (ANT) focuses on how human and nonhuman actors form stable, heterogeneous networks of aligned interests through processes of translations and negotiations (Callon, 1986; Law, 1992). According to Latour (2005), ANT is holistic in its incorporation of humans and non-human into actor-network. This means that human and nonhuman actors have relationship, which ultimately shapes each other (Law, 1992). Despite possible human actors' different understandings and intentions, they are able to associate and influence each other (Latour, 2005). In ANT, translations are the interactions that happen between actors and their many manifestations (Callon, 1986). Translations entails four moments: problematization, interessement, enrolment and mobilisation (Callon, 1986). Accessing, use and management of healthcare big data involve processes of interaction and negotiations between: humans, human and nonhuman, and nonhumans.

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