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Analysing Change Resistance to an Information Systems-supported Process in a South African Public Hospital

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ANALYSING CHANGE RESISTANCE TO AN INFORMATION SYSTEMS-SUPPORTED PROCESS IN A SOUTH AFRICAN PUBLIC HOSPITAL

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Abstract

The purpose of this study is to fill the gap of understanding hospital staffs' perceptions towards change, caused by introducing an information system into one of the hospital's daily processes. It also aims at understanding reasons behind resistance to change while finding appropriate intervention strategies to deal with and minimize observed resistance to change from an information system. This contributes to the body of knowledge regarding change resistance to information systems in public South African hospitals.

The case study research strategy was combined with an inductive approach. Fourteen interviews (7 medical doctors and 7 ward clerks) were conducted and thematically analysed resulting in a change resistance conceptual model. The generated conceptual model asserts that five main factors contribute to change resistance: unclearly defined duties; fear of job security and technology usage; years of service; resource availability and resource mismatch; as well as insufficient training resulting from the lack of a learning culture. The conceptual model can be used as a basis to conduct a root-cause analysis regarding successfully introducing change into a public hospital. Change agents should aim to understand the status quo of the organization and find ways of incorporating that into the change process.

Keywords: Change resistance, Information system-supported process, South African public hospital.

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1.   Introduction

There is significant inequality in South Africa's health sector primarily due to the inadequate allotment of resources between the public and private health sector (Ataguba & Alaba, 2012; Harris et al., 2011; National Department of Health, 2010; Pillay, 2008; World Health Organization, 2013). Although the public health sector services the majority of the population, it is overburdened and underfunded in proportion to the services it provides (Ataguba & Alaba, 2012; National Department of Health, 2010; Pillay, 2008; Weimann & Stuttaford, 2014).

There are obstacles and inefficiencies in the process flows of South African public hospitals (Stuart-Clark et al., 2012; Weimann & Stuttaford, 2014). One such issue is the inefficient patient flow within hospitals (Eitel, Rudkin, Malvehy, Killeen, & Pines, 2010). Studies have reported of frustration expressed by patients at the long waiting time in queues at emergency departments before being treated (Armony et al., 2011; Eitel et al., 2010; Weimann & Stuttaford, 2014). This is often due to the shortage of inpatient beds, either from an extended length of stay, high occupancy rate, delayed discharge, or non-medical related delayed discharges and shortage of staff (Eitel et al., 2010; Groenewald et al., 2010; Ubbink et al., 2014). This shortage of inpatient beds ultimately affects the flow of patients, as patients who are admitted are forced to wait until beds become available (Eitel et al., 2010). Another inefficiency stems from the lack of a proper record-keeping system, which needs to be strengthened in order to improve service delivery and decrease the number of patient records that go missing after time lapses (Stuart-Clark et al., 2012).

The Western Cape is one of the provinces in South Africa, and its Department of Health has joined the mission to provide patient-centred quality care, which aligns with the national Batho Pele policy framework to put the well-being of patients first. To reach the goal of providing patient-centred quality care, tertiary hospitals in the Western Cape are constantly embarking on change initiatives to improve the services they provide. These improvement initiatives include the introduction of information and communication technologies (ICT) (Patel, 2014). Studies indicated that introducing information systems (IS) into hospital processes often resulted in improved processes, increased efficiency, satisfied patients, and content staff members (De Mast, Kemper, Does, Mandjes, & Van Der Bijl, 2011; Johnson & Capasso, 2012; Litvak & Bisognano, 2011).

Since public hospitals are under-resourced (National Department of Health, 2010), it is imperative that when improvements to processes are considered, the focus is put on improving patient care and patient experience by using the available, yet limited resources more efficiently (Hall, Belson, Murali, & Dessouky, 2013). One way to do so is through improving process flows, as this can positively impact patients' satisfaction (Armony et al., 2011; Eitel et al., 2010).

Research Problem: Very little research has been done on information technology (IT) investment among hospitals, it's effect on the personnel, as well as how it influences patient care and financial performance (Adeleke et al., 2015; Devaraj, Ow, & Kohli, 2013; Sheikh, Sood, & Bates, 2015). Additionally, there is a lack of research that empirically examines the use of information technologies among healthcare providers and their impact on the quality of care delivery (Bardhan & Thouin, 2013). Furthermore, prior research on electronic medical records focused on technical issues, and not managerial issues. Consequently, little is known about "users' resistance to new technologies and the antecedents of technology rejection in healthcare" (Adeleke et al., 2015; Lin, Lin, & Roan, 2012, p. 1965). Therefore, this study seeks to fill the gap of understanding South African hospital staffs' perceptions towards change, caused by introducing an information system into one of the hospital's daily processes. Where resistance is identified, the study aims to understand the reasons behind such resistance. Finally, it intends to find appropriate intervention strategies to deal with and minimize resistance. In doing so, the study seeks to contribute to the body of research regarding change resistance to information systems in public hospitals of developing countries.

1.1 Research Question and Research Objective

The primary research question was; Why is there resistance to introducing an IS in a tertiary care SA Public Hospital? This shall be analysed once the following sub-questions are answered; What are the perceptions towards change using an IS? What are the reasons for change resistance to the introduction of an IS? Lastly, what can be done to confront change resistance to the introduction of an IS?

The main research objectives are to understand the perceptions towards change triggered by an information system-supported process in a SA Public Hospital, based on the proposed business process; and to conduct a root-cause analysis to understand the reasons for change resistance, as well as how to confront change resistance towards an IS-supported process in a hospital setting.

1.2 Necessity for and Value of Research

Understanding hospital staffs' perceptions towards change initiated by an information system will be beneficial to both practice and the information systems body of knowledge. In practice, it will help hospital management to devise intervention strategies to minimize resistance and its effect on hospital processes and any future improvement initiatives through information and communication technology (Lin et al., 2012). Furthermore, since most information system designs prioritise system functionality over "user considerations such as the system's impact on users' work behaviours and potential resistance", understanding their perceptions to such change initiatives could contribute to designing information systems that prioritize both functionality and user considerations (Bhattacherjee & Hikmet, 2007, p. 726). Lastly, regarding the information systems body of knowledge, this study will contribute by providing data and information from a South African context, which other studies can use when further investigating issues of change resistance initiated by information systems.

1.3 Limitations of the study

With the aim of the study in mind, there are limitations to consider. Firstly, since the study is both descriptive and exploratory in nature, further research is essential to increase understanding of change resistance to information system-supported processes in public hospitals.

Secondly, the study used one hospital ward as the case. Due to the nature of the hospital business and the study's time constraints, only 14 hospital personnel were interviewed, thus, the findings may be deemed as context dependent, and not generalizable to public hospitals (Flyvbjerg, 2006). A larger sample size of hospital personnel could improve the accuracy of the study; however, Flyvbjerg (2006) highlights the lack of generalizability and small sample size as contributors to misunderstandings about case study research. Flyvbjerg (2006) asserts that "one can often generalize on the basis of a single case" (p.228), and negates the necessity for a large sample size because it does not afford the researcher the opportunity to "be corrected by the study objects" (Flyvbjerg, 2006, p. 236). To minimize organizational biases, respondents were reassured that their responses would not be traceable and that pseudonyms would be used to ensure anonymity. However, some respondents were afraid to answer questions honestly. This was indicated in the disclaimers they gave before answering the questions asked.

Lastly, since this was an inductive study which involved interviews, there were observer biases and structural limitations during data collection. Battacherjee (2012) states that observer biases can be reduced but not eliminated, as the interview process required the observer to be part of the process (Bhattacherjee, 2012). According to Flyvbjerg (2006) "the case study contains no greater bias towards verification of the researcher's preconceived notions than other methods of enquiry….but instead contains a greater bias toward falsification of preconceived notions than towards verification" (p.237). Nevertheless, future research to better develop the understanding of change resistance in hospitals is encouraged.

1.4　　Research Context

Case Study: Groote Schuur Hospital

Groote Schuur Hospital (GSH) is an academic hospital in South Africa, situated in Observatory in the Western Cape. It is one of three academic tertiary hospitals central in the Western Cape, and is internationally renowned for the first human-to-human heart transplant that took place in 1967 (Mars & Seebregts, 2008; Patel, 2014; Western Cape Government, 2014). The hospital is committed to providing "access to patient-centred, quality care, by adopting a theme of leadership, innovation, and change" (Patel, 2014, p. 5).

Groote Schuur Hospital was chosen for this study primarily because of its innovation program that seeks to innovatively improve hospital processes (Patel, 2014). This innovation program was launched in October 2014 to tackle eight challenges; the first three of which relate to this study. They are: tracking and communicating; patient records and notes; more efficient entry and exit; using waiting time effectively; sustaining a culture of care and dignity; improving care for specific patient groups; working better with district health services; and boosting volunteer resources (Patel, 2014).

Case Study Ward: Acute Medical Ward

There are four adjacent acute medical wards at Groote Schuur Hospital, New Main Building; these wards are located two floors above the pharmacy.

Apart from the nurses present in the ward, two teams of medical professionals called a firm, service each ward. Each team is called a ward firm, and consists of a consultant, a registrar, and two medical interns. Each ward firm is divided into two sub-ward firms, and is on duty on alternate weeks. This gives each team time to attend to their patients from the point of admission to the point of discharge, assuming a patient is discharged after a week. It is anticipated that the next time the same team is on duty, there would be capacity to admit new patients. However, this is not the case. Sometimes, patients who are discharged later in the day leave the hospital the following day due to various reasons. There are different non-medical reasons that lengthen patients' in-hospital stay.

2　　Literature review

The literature review summarises recurring issues found in literature that are relevant to the study, such as health care service delivery in South Africa; information systems in health care service delivery; change in health care service delivery using an information system; change resistance in health care; and change management.

Health care service delivery in South Africa

In South Africa is a noticeable national need to improve service delivery in general (Fraser-Moleketi, 2007; Skweyiya, 1997). However, in the context of healthcare, the aim is to provide service delivery that aligns with the Batho Pele policy framework, in that it is patient-centred and effective in delivering services which meet the basic needs of all South African citizens (Skweyiya, 1997). The South African National Department of Health has committed to introducing a National Health Insurance (NHI) policy in an attempt to increase access to quality, standardized, affordable health care services, and to improve efficiency in health care service delivery (Department of Health, 2014; National Department of Health, 2014; Sekhe-jane, 2013; World Health Organization, 2014). This will be done by pooling funding from both health sectors to address the current issues in health care and propel the health sector towards the 2030 health care goals (Department of Health, 2014; Matsoso & Fryatt, 2013; Sekhejane, 2013). These initiatives by the government could result in a future narrowing of the gap between the private and public health sector, and more finances invested into the public sector. Although the NHI addresses issues of inequality, it omits issues such as "combating corruption, im-

plementing ethical values for health care professionals, regular surveillance, and gauges for improved health services" (Weimann & Stuttaford, 2014, p. 10). Nevertheless, this need for improvement stems from issues of recorded high infant mortality rate and the disparity between the quality of services in the public and private health sector depending on patients' income levels. Additionally, issues include low life expectancy and the undeniable correlation between under-resourced public health care facilities and the current national health profile (Sekhejane, 2013; World Health Organization, 2013, 2014). The issues aforementioned are among factors quoted for inefficiencies experienced and frustrations expressed, and thus the need to change hospital process flows (Bigelow & Arndt, 2005; Stuart-Clark et al., 2012).

Information systems in health care service delivery

In developing countries, several public health service providers have made efforts at reducing the inefficiencies and obstacles experienced, by using information systems – replacing paper-based health records with electronic health records (Tierney et al., 2010). However technological improvements such as electronic health records (EHR) and electronic prescriptions are often strongly resisted by physicians and those meant to benefit from it (Bhattacherjee & Hikmet, 2007). Other limitations to implementing information systems in health care are: user resistance; limited resources; low internet connectivity and technology mismatch; high bureaucracy; low computer literacy; change in the work culture; implementation and electricity costs; and an increased work load (Berg, 2001, p. 154; Bhattacherjee & Hikmet, 2007; Cline & Luiz, 2013; Goldzweig, Towfigh, Maglione, & Shekelle, 2009; Rohleder, Lewkonia, Bischak, Duffy, & Hendijani, 2011; Sambo, 2015; Weimann & Stuttaford, 2014).

Change in health care service delivery using an information system

The healthcare sector can be seen as the backbone of a nation's public health and economy (Lin et al., 2012). Information technology is becoming a crucial part of medical practices and hospital administration (Lin et al., 2012). Certain government and healthcare organizations have advocated for the use of health information systems because of its ability to reduce medical error rates, improve healthcare delivery quality, and lower healthcare costs (Bhattacherjee & Hikmet 2007). Moreover, information systems improve internal hospital processes, as they support medication administration, patient monitoring, and documentation systems (McMillan & Perron, 2013).

Change resistance in health care

Despite the expected benefits that come with using information systems in healthcare, resistance to change undermines those benefits and impedes on such change initiatives (Bhattacherjee & Hikmet, 2007). One reason given by change recipients for resisting change is the fear of job stability, coupled with feelings of stress and insecurity (Bateh, Castaneda, & Farah, 2013; Burchell, 2011; Erwin, 2009; McMillan & Perron, 2013). Unemployment is a major concern in South Africa, consequently, employees become anxious, unwilling and unprepared to embrace anything that could result in them losing their jobs (Bateh et al., 2013; Nene, 2015). Bernerth et al., (2011) further provide the following reasons for change resistance: change fatigue, change cynicism, and psychological uncertainty. Other reasons include: communication breakdown with stakeholders, lacking the experience and motivation to recognize the urgency of change, and a lack of information about the advantages of the change (Bateh et al., 2013; Erwin, 2009; Ford et al., 2008; Georgalis, Samaratunge, Kimberley, & Lu, 2015; McMillan & Perron, 2013).

Change management

Change management involves tactful strategies and approaches that provide support to people and their organizations in the successful transition and adoption of change. Introducing change to an organizations' normal processes can potentially bring about positive or negative results, but this depends on the manner in which the change was facilitated and integrated into the organization (Bjaalid, Laudal, & Mikkelsen, 2015; Gunasekaran & Kobu, 2002). According to Brisson-Banks, (as cited by Bateh et al. 2013), the success of change management depends on the organizational structure, availa-

bility of resources, vision and mission of the organization, and employees' willingness to work towards change-related goals. Furthermore, all stakeholders and employees should be included in the process when change is taking place (Al-Abri, 2007).

3   Methodology

The study adopted an interpretivist stance and an inductive approach. It applied a case study research strategy that used semi-structured interviews to collect data. The research instrument was adopted from studies by Bhattacherjee & Hikmet, 2007; Bjaalid et al., 2015; Cline & Luiz, 2013.

The study used non-probability sampling, coupled with the purposive technique. The target population was tertiary public hospitals in South Africa. The group sample chosen were ward clerks and medical interns. The interview sample size was 14 participants; seven ward clerks and seven medical interns. A smaller sample size increases the depth of the findings of data collected qualitatively (Bhattacherjee, 2012; Flyvbjerg, 2006; Gray, 2014). This group was chosen because the interns had worked at the hospital for less than 2 years, while the minimum years of service for one of the clerks was 2 years. Since resistance is said to evolve with time (Bhattacherjee & Hikmet, 2007), the selection was based on the assumption that the interns would not have worked at the hospital long enough to react to change in a similar manner to long service employees, regardless of the employment position.

Collected data was analysed using Nvivo, for themes and sentiments, to explore the reasons for change resistance to information systems-supported change, and to explore methods of successfully introducing change to tertiary public hospitals in South Africa. Nvivo is a software technology used to manage coding procedures, by reducing manual tasks and affording researchers more time to discover tendencies, recognize themes, and derive conclusions (Hilal & Alabri, 2013; Saunders, Lewis, & Thornhill, 2008). Nevertheless, the research time horizon was cross sectional, over 6 months.

4   Research Findings

This section presents a summary of the research findings of respondent's perceptions towards change, and root-cause for change resistance, grouped by respondent type – ward clerks and medical interns. Thereafter, it will describe the analysis with the coding results.

4.1   Summary of findings: Perception towards Change

Willingness to Learn and Use New System

Wards: Most clerks were willing to learn to use the new system but expressed that they would not use it for fear of an increased workload. Emphasis was on the fact that they did not want to take responsibility for any errors, as they do not subscribe to legal insurance.

Medical Interns: All medical interns were willing to learn to use the new system. Inspite of their willingness, some were concern about the feasibility of using it. However, the consensus was that they would use the new system if it positively affected patient flow and improved patient satisfaction.

Perceptions of Information Systems

Wards: All the clerks were willing to move to a paperless system. Emphasis was placed on the need to backup data in case of system failure.

Medical Interns: All interns were in favour of moving to a paperless system. Some issues of concern were highlighted: electricity and technology failures, confidentiality and legal regulations.

Perceptions of using Information Systems

Wards: All the clerks shared the same sentiment that using an information system is better than using a paper system. Furthermore, they stated that not using an information system would slow down the process. Lastly, they preferred using the information system to using the paper system.

Medical Interns: With the exception of a few, most interns indicated that they found working with the information system to be easier, hygienic, and less time consuming and would prefer it to the paper system. The others preferred the paper system as they are used to it. They said that the information system would only be beneficial for bulk prescriptions.

4.2   Root-Cause Analysis

Perceptions of Service Delivery

Ward Clerks: Most of the clerks believed there is a difference in service delivery when using the information system. However, one of the clerks disagreed with the rest. This clerk argued that service delivery remains the same because it depends more on doctors than on the information system. Lastly, all the clerks believe that the information system would improve staff morale and relieve stress.

Medical Interns: With the exception of three interns, most interns stated that the information system would cause a positive difference to service delivery, although they were uncertain of its effect on staff morale. The other interns expressed that the job still got done, although the process may be easier. They also alluded to staffs' morale improving once they became accustomed to using the information system.

Perceptions of Record Management

Ward Clerks: All the clerks agreed that the information system organizes patient information better. One clerk said that the information system did not affect record management, but served as a way to backup information. But the rest felt that the information system would improve record management by making it more efficient.

Medical Interns: All the interns agreed that the information system organizes patient information better, and minimizes record-loss. However, 3 interns felt that using the information system was time consuming and a duplication of effort.

Perceptions of the current process

Ward Clerks: Apart from one clerk, no other clerk expressed any sentiments towards the current process. They explained that processes have been done a certain way for a long time, and they adapted to the process upon employment. The other clerk expressed unhappiness at the way current processes are done, as it negatively affects patients.

Medical Interns: Interns' sentiments varied from being content because of their personal work ethic, to unhappiness because of management coercion, communication break-downs, and having to adapt to the way things have always been done.

Perceptions of Change in the Hospital

Ward Clerks: In spite of identifying the presence of positive change, most clerks expressed their frustration regarding the process with which change is introduced. They lamented about the top-down approach, and about how they felt ignored, yet coerced to comply, by management. They felt that for change to take place successfully, management should prioritize communication, mutual respect, and involvement. Emphasis was placed on giving employees time to adjust to the change once they have agreed to it, as well as including any job-related changes in their job descriptions.

Medical Interns: Although some interns identified that positive change is taking place, the majority highlighted possible reasons why change was not taking place; such as a lack of funding, unwillingness to change, technological mismatch, and strict regulations. Most interns felt that ways to introduce

change successfully include providing training, publicizing positive results from pilot projects, communicating to those potentially affected by the change, giving prior notice of the change, and potentially integrating new systems with systems already in use. One intern added that management should be willing to amend systems that are not working as opposed to insisting on its use. Lastly, not changing too many things at once, but allowing for a level of consistency, while changing a few things.

4.3   Analysis

Before commencing analysis, transcribed data was "cleaned" by rephrasing sentences without losing its meaning. To analyse the data, the researcher identified important information based on what stood out during the interviews by what respondents emphasized, and repeated. Thereafter, labels were given to the identified information, and similar information was grouped to form a node. Then, nodes were categorized based on similarities, to form themes. Themes were arranged according to the research objectives. After coding once, the researcher re-read all the transcripts to make sure there were no omissions. This research used both inductive open and axial coding methods to code the transcriptions, before using sentiment and thematic analysis. Open coding was conducted over several iterations. This was to ensure that the data was read thoroughly, all possible concepts were identified, and similar concepts were grouped together under the same label, resulting in fewer subsequent codes see *Table 1.*

Iteration One	Iteration Two	Iteration Three	Iteration Four	Iteration Five	Iteration Six
136 Open codes	128 grouped codes	72 grouped codes	48 grouped codes	27 grouped codes	9 grouped codes

Table 1: Resultant Code groups

After iteration six, the nine resultant codes were used for axial coding. The resultant codes arranged to depict a causal relationship, which is later used to explain the root cause for change resistance and as such is referred to as the Change Resistance Conceptual Model. The resultant codes are Resistance, Communication, Management, Status Quo, Duties, Fear, Time, Resources, and Learning Culture. Each resultant code consists of sub-codes, from previous open coding iterations. These resultant codes are arranged to form five main independent variables (Duties, Fear, Time, Resources, and Learning culture) and three moderating variables (Status Quo, Management, and Communication).

5   Discussion

This section presents a discussion on key findings that contribute to meeting the research objectives and purpose and thus answering the research question. The discussion section is organized according to the objectives while highlighting themes that meet those objectives.

5.1   Objective One: Perceptions towards Change

Some participants were reluctant to accept the change, unless there were employment regulations in place that legally protect them from being prosecuted in the event of errors. Similar concerns were also highlighted in a study by Zaragoza (1999). Although the phenomenon being studied related to electronic health records being moved to another health care facility, the concerns are applicable to this study, as they relate to information systems in healthcare being used to capture patient records. All the same, these concerns refer to there being grave legal consequences for errors made while capturing medication requests. It also implies that there is a high possibility for errors to occur. The concern was further echoed in studies that listed regulations as one of the barriers to adopting an electronic documentation system in a healthcare facility (Cagle et al., 2012; Rippen, Pan, Russell, Byrne, & Swift, 2013).

 On the one hand, some participants were willing to learn by using the new system in order to remain relevant in their job position. Unemployment is a major concern in South Africa, and employees are unwilling to do anything that could result in them losing their jobs (Bateh et al., 2013; Nene, 2015). As a result, in order for them to not be classified as an "obsolete resource", employees would be willing to learn any new systems that are introduced. On the other hand, some participants indicated their willingness to increase their skill set by learning to use the new system. However, they explicitly said that they were not willing to use it as part of their job. The willingness to increase their skill set could be seen as an attempt to increase their computer literacy skills, and distinguish themselves from colleagues with low computer literacy skills. Additionally, the willingness to learn is said to contribute to reducing resistance to change (Cline & Luiz, 2013). Cline and Luiz (2013) further stated that lower computer literacy skills contribute to resistance to technological change in healthcare. However, stating their unwillingness to use the system as part of their job could mean that they equate the process of learning to use the new system as a precursor to an increased workload. According to Cline and Luiz (2013), hospital staff fear new systems being implemented, as they believe that it will result in them doing more work due to adjusting to the new technology (Cline & Luiz, 2013). Furthermore, unless such change has been documented as part of their job description, they may not be willing to incorporate it as part of their job. Chaulagai (2005) suggests that after training employees to use new information systems, their job descriptions should be edited accordingly to include any changes that involve the new system that has been taught (Chaulagai, 2005).

Another concern supported by Berg (2001), relates to the method of implementation and maintenance. According to Berg (2001), in order to reduce resistance when implementing technological change, management should regard the employees who will use the new systems, as well as to implement it as a form or organizational development, as opposed to merely "rolling out" the new system (Berg, 2001, p. 154).

Lastly, most of the clerks and medical interns were willing to accept the change on condition that it not only improved patients' experiences, but also improved the overall process.

This contradicts studies which state that physicians, those in specialized fields, as well as those meant to benefit, often strongly resist technological improvements (Bhattacherjee & Hikmet, 2007; Rohleder et al., 2011). Since introducing technology into hospital processes has been said to improve such processes (McMillan & Perron, 2013), and implicitly meets the condition aforementioned, it can be assumed that the clerks and medical interns may be willing to accept the change.

In conclusion, acknowledging the potential benefits that could result from the change caused by an information system, and being willing to learn how to use the system, are not indicative of one's willingness to accept and use the system as part of their job. Some reasons that contributed to participants' willingness to learn to use the system include the fear of losing their job, as well as the need to remain relevant for the job position. The researcher believes that the fear of job loss should not be considered as a contributing factor for accepting change, as it is largely influenced by South African demographic factors.

5.2   Objective Two: Root-cause analysis

Root cause analysis is a problem-solving approach used to identify and understand the underlying causes of an event (Hughes, 2008). After the analysis, codes that were relevant to the root-cause analysis were grouped into 8 main themes. The themes were further analysed to form the Change Resistance Conceptual Model.

The Change Resistance conceptual model is applied to explain the results from the root-cause analysis. The conceptual model consists of five independent variables, one dependent variable, and three moderating variables. According to Bhattacherjee (2012), an independent variable is used to explain another variable, while a dependent variable is explained by other variables. A moderating variable "in-

fluences the relationship between the independent and dependent" variables (Bhattacherjee, 2012, p. 16). The independent variables are duties, fear, learning culture, resources, and time. The dependent variable is resistance, while the three moderating variables are status quo, communication, and management.
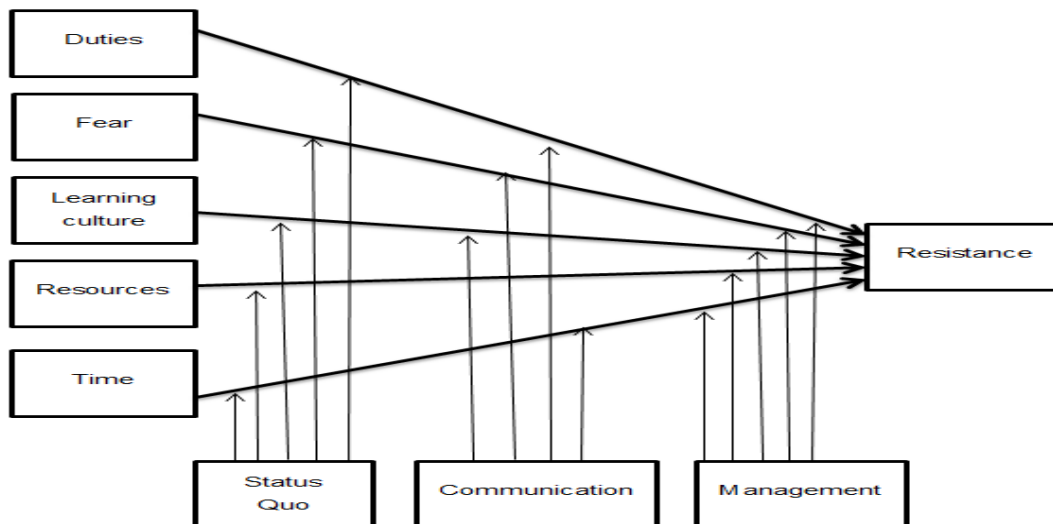

Figure 1: Change Resistance Conceptual Model

Status quo consists of the sub-constructs comfortable and no improvement from technological change. These sub-constructs refer to behaviours to which the participants have become accustomed. They expressed that they seldom notice any improvements resulting from technological changes previously implemented (Antwi & Kale, 2014; Bhattacharyya et al., 2010; Bhattacherjee & Hikmet, 2007).

In addition to the literal meaning of communication, the variable **Communication** consists of the sub-constructs accountability, knowledge of the process, and involving stakeholders. These sub-constructs refer to preferred actions by management towards staff, and potential resultant reactions (Bimerew, 2015; Patel, 2014). Accountability refers to stakeholders being able to give an account for their contribution to tasks during the process. Furthermore, they are able to account for any errors and omissions caused. Knowledge of the process refers to every stakeholder knowing and understanding the process. Involving stakeholders refers to including and considering those affected by the change at every step of the change process.

Management consists of the sub-constructs management involvement, management decisions, and top-down approach. These sub-constructs refer to actions and approaches by management that often negatively affect the staff. Management involvement refers to the staffs' desire for management to increase their level of interaction with them (Bimerew, 2015). Likewise, for management to become more acquainted with process impediments they often encounter. Management decisions refer to decisions that management makes without considering or consulting those who are directly affected. This is important most changes made are largely influenced and initiated by management (Straatmann, Kohnke, Hattrup, & Mueller, 2016). Top-down approach refers to the manner in which instructions are given and decisions are made; they are made by management, at the top, and executed by the staff, and the bottom (Lunenburg, 2010).

Duties consist of the sub-constructs job description, reporting structure, and responsibility. These sub-constructs refer to job-related activities. Job description refers to a legal document that details the requirements that form part of an individual's job, which, according to Chaulagai (2005), if not updated to include new tasks, could result in staff being reluctant to execute tasks not detailed in the document

(Chaulagai, 2005). Reporting structure refers to knowing the people within the hospital to whom issues are escalated (Antwi & Kale, 2014). However, the respondents alluded to inaction being the outcome of an escalated issue (Straatmann et al., 2016). Responsibility refers to being held liable for occurrences while carrying out tasks that form part of one's job. This especially relates to incorrect data capturing on the information system. In view of these sub-constructs, the variable, duties, could be seen to influence participants' resistance.

What is more, a relationship can be observed between duties, status-quo, communication, and management. The staff feels that management makes decisions about their jobs without consulting them, or including them. In addition, since the hospital staff has become accustomed to the tasks they execute, any changes to their job risks being resisted, unless it is included in their job description. Furthermore, the staff finds the process of escalating issues to their management futile, as they believe no further communication occurs, they are not able to hold management accountable, and nothing changes. Consequently, if they encounter an issue that could legally implicate them, they do not feel protected. Therefore, staff would be resistant to change, as they feel that in the event of an issue, nothing will be done to assist them.

Fear consists of the sub-constructs job security and technology usage. These sub-constructs refer to factors that induce fear in some of the participants, regarding change. Job security refers to being afraid of losing one's job, as well as the surety of keeping it. The participants expressed that they felt coerced into learning new systems, as they risked losing their jobs if they did not learn (Bateh et al., 2013). Technology usage refers to the fear of using computers without enough computer skills (Cline & Luiz, 2013). In view of these sub-constructs, the variable, fear, could be seen to influence participants' resistance.

Moreover, a relationship can be observed between fear, communication, and management. Through constant communication, staff could be reassured of their job security. This could positively influence their willingness to learn to use the system, and decrease the possibility of resistance. In addition, increased communication between staff and management about the process could contribute to reducing resistance, as the staff can express their fear regarding using technology, and management could find methods of combating this fear. In addition, both groups of stakeholders would better understand the process, and understand the need for the new system.

Learning culture consists of the sub-constructs pilot project, training, and flexibility to change. These sub-constructs refer to factors that contribute to creating a learning culture at the hospital that could reduce resistance to change (Bateh et al., 2013). Pilot project refers to introducing and implementing change in a small part of the hospital, before rolling it out in all the other departments (Infoway, 2013; Mutale et al., 2013). Training refers to teaching potential system users how to use the system (Cline & Luiz, 2013). Flexibility to change refers to allowing people to decide whether they want to change by using the system (Lunenburg, 2010). In view of these sub-constructs, the variable, learning culture, could be seen to influence participants' resistance.

A relationship can be observed between learning culture, status-quo, communication, and management. By cultivating and encouraging a learning culture within the hospital, staff members could be less resistance to change, as they would anticipate that training would be provided to help them adjust to the change. In addition, gradually introducing change by piloting the project would help both staff and management get used to the change. This however requires management involvement from the point that the change is introduced as a pilot project. Through communication and management involvement, staff will understand that they have the decision to accept and acclimatize to the change. However, the extent to which they may be willing to accept and acclimatize to the change may depend on the degree and frequency of communication and management involvement.

Resources consist of the sub-constructs technology mismatch, technology failure, human capital, and funding. These sub-constructs refer to factors that can be improved in order to facilitate change.

Technology mismatch refers to implementing computer systems that are incompatible with the computer hardware provided, which often results in malfunctioning systems (Zaragoza, 1999).

Technology failure refers to information systems that were previously implemented with the intention to support and improve process tasks, however are unreliable, as they malfunction during peak process times (Bjaalid et al., 2015). Human capital refers to the shortage of hospital personnel, which negatively affects workload (Sambo, 2015). Funding refers to the lack of financial resources available to support technological improvements, and results in use of outdated technological hardware. In view of these sub-constructs, the variable, resources, could be seen to influence participants' resistance.

Moreover, a relationship can be observed between resources, status-quo, and management. In that, the hospital's management could be reluctant to invest resources in technological improvements, because of technological failure that has formed part of the hospital's process status-quo, consequently contributing to the technology mismatch (Cline & Luiz, 2013; Sambo, 2015).

Finally, **time** consists of the sub-constructs age, years of service, grace period, and staff turnover. These sub-constructs are believed to gradually influence change resistance (Bhattacherjee & Hikmet, 2007; Cline & Luiz, 2013; Lunenburg, 2010). Age refers to how old the participant is. Years of service refers to the duration of time the participant has worked at the hospital. Grace period relates to the period given to staff to adjust to the change. Staff turnover refers to the number of staff who leave, and those employed to replace them. Studies found a correlation between these sub-constructs and resistance (Bhattacherjee & Hikmet, 2007; Cline & Luiz, 2013; Lunenburg, 2010). Therefore, the variable, time, could be seen to influence participants' resistance.

Additionally, a relationship can be observed between time, status-quo, management, and communication. The longer the years of service spent in an organization, the more one becomes accustomed to doing things a certain way, and more resistant to change. Often this resistance is directly related to age; the older the individual is, the more resistant to change they would be. Likewise, management involvement could positively influence time. This, as management would get a better understanding of an appropriate grace period needed for the staff to adjust to the change. Consequently, this could positively influence staff turnover, as less staff would want to leave, knowing that they are better understood and supported by management.

In conclusion, duties, fear, learning culture, resources, and time, have been used in an attempt to explain the root-cause of change resistance. While status quo, communication, and management were used to influence the relationship between the independent and dependent variables. The overall importance of involving stakeholders during change processes, as well as encouraging constant communication between the stakeholders was emphasized as a way to mitigate resistance (Fullan, 2011; Patel, 2014).

6   Conclusion and Recommendations

This study intended to fill the gap of understanding South African hospital staffs' perceptions towards change, caused by introducing an information system into one of the hospital's daily processes. This would be beneficial to both practice and the information systems body of knowledge by providing information on how to deal with change resistance in the South African context.

Literature highlighted issues of process inefficiency, staff unhappiness, resource scarcity, and patience disatisfaction related to current public hospital processes (Adam et al., 2012; Kimaro & Nhampossa, 2004; Kinfu, 2013; Weimann & Stuttaford, 2014). Some studies indicate that introducing information systems into hospital processes often result in improved processes, increased efficiency, satisfied patients, and happier staff members (Gladwin, Dixon, & Wilson, 2003; Lapointe & Rivard, 2006; Peck, Benneyan, Nightingale, & Gaehde, 2012; Rohleder et al., 2011). However, it involves limitations such as: low computer literacy skills, limited resources, leadership challenges, waste of

resources, low internet connectivity, staff resistance, and a technology mismatch (Cline & Luiz, 2013; Jacucci, Shaw, & Braa, 2006; Jingshan Li & Howard, 2010; Mutale et al., 2013). Some solutions to facilitate the implementation of an information system in a healthcare environment include: ensuring that the proposed technology is kept simple, relevant, and similar to the technology already in use, as well as involving stakeholders in the change process, and providing role specific training (Kachienga, 2008; Pillay, 2008; Rohleder et al., 2011; Wernz, Zhang, & Phusavat, 2014).

Nevertheless, the study adopted an interpretivist stance, and an inductive approach. It used a case study research strategy which used a mixed method approach to collect data. Collected data was used to describe the difference between the current and proposed process. In addition, it was used to explore reasons for change resistance to information systems-supported change, and to explore methods of successfully introducing change to tertiary public hospitals in South Africa. Nvivo was used to analyse the qualitative data collected. The methodology was chosen to contribute to answering the research questions and meeting the research objectives.

Regarding the participants' perceptions towards change, some of the main findings:a general willingness to learn by using the new information system, to either expand their computer literacy skill set, out of fear as an attempt to save their job, or to use it as part of the process. However, some of the participants who indicated their unwillingness to use the system as part of their job believed that it would result in an increased workload. Other participants were only willing to use the information system if it added value to the current process, and if the results were beneficial to patients.

From the root-cause analysis, it was understood that duties, fear, learning culture, resources, and time directly affect participants' resistance to change. Status-quo, management, and communication influence the possible level of resistance. In addition, to ultimately reduce and mitigate resistance to change, it is important to involve stakeholders during change processes, as well as to encourage constant communication between the stakeholders. Lastly, management involvement with the staff is imperative to improve the general relationship between these two groups and increase understanding.

However, to improve this study, a larger research sample size in addition to more case hospitals could be used when replicating the study, to improve the statistical generalizability of the findings. In addition, action research could be used as a research strategy, as it affords the researcher more time to gain an in-depth understanding of the phenomenon.

Nevertheless, from the study, it can be concluded that in South African public hospitals, the staff are not entirely resistant to change using an information system. The resistance expressed relates more to the relationship between themselves (the staff) and the management team regarding how instructions and information are relayed to them, as well as from the lack of interaction and involvement from the management team. In addition, continuous change, without an unchanged reference point, could leave staff confused and unsettled. This presents a research opportunity into the relationship between hospital staff and their management team, relating to how technological change is introduced and managed. By considering the research results when embarking on an information system related change project, it could improve the overall process by encouraging more buy-in and less resistance from the intended system users.

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