



A thesis titled:

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

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By

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# Abstract

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Introducing technological change to an organization's normal processes can potentially bring about positive or negative results, depending mostly on the manner in which the change was facilitated and integrated into the organization. However, very little research has been done on information technology (IT) investment among hospitals, its effect on the personnel, as well as how it influences patient care and financial performance. Consequently, little is known about users' resistance to new technologies and the precedents of technology rejection in healthcare.

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 towards change is identified, the study aims to understand the reasons behind such resistance. Finally, it aims 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 South African hospitals.

By adopting a descriptive and exploratory interpretivist paradigm, in conjunction with an inductive approach, the study aims to get a better understanding of hospital staffs' perceptions through shared meaning. The study adopted a case study research strategy, as it affords the researcher the opportunity to participate in the study, and as such contributes to the subjective interpretation of the findings. Data was collected using a mixed method approach, and was used to describe the difference between the current and proposed process. In addition, it was used to explore the reasons for change resistance to information system-supported change, and to explore methods of successfully introducing change to tertiary public hospitals in South Africa.

Fourteen participants (7 medical interns and 7 ward clerks) who were directly involved in the process being studied, were interviewed. Two other participants (the head of the pharmacy and the patient flow manager), who were indirectly involved in the process, were interviewed, to verify the observed and mapped process. Interview data was analyzed qualitatively, firstly through coding techniques before using sentiment and thematic analysis. While the mapped process followed Business Process Modelling Notation conventions.

In addition to a mapped proposed process, a change resistance conceptual model was developed from a conjunction of the findings and extensive review of literature. The 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. These factors can be moderated by: the existing state of affairs referred to as status quo; management involvement; and communication.

The conceptual model can be used to better understand the causes of change resistance, as well as how to minimize change resistance and successfully introduce change into a health organization. Change agents should aim to understand the status quo that exists in the organization and find ways of incorporating that into the change process. Furthermore, management should aim to involve and communicate with all affected stakeholders during a change process. This research has provided a better understanding of hospital staffs' reactions to change, their reasons for resistance, and ways to minimize change resistance while successfully introducing change into a health organization.

Keywords: Change resistance; Change management; Process change; Healthcare service delivery;

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# Chapter 1: Introduction

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## 1.1. Background and Research Problem

There is significant inequality in South Africa's health sector primarily due to the unequal 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 South Africans, 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 in hospitals (Eitel, Rudkin, Malvey, 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 (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 in long queues 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 contribute towards improving service delivery and decreasing 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. In an attempt 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 often 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 happy staff members (De Mast, Kemper, Does, Mandjes, & Van Der Bijl, 2011; Johnson & Capasso, 2012; Litvak & Bisognano, 2011).

Since public hospitals are already 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 (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, its 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 will aim to understand the reasons behind such resistance. Finally, it aims 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 South African public hospitals.

The following section details the research question and sub-questions posed to address the problem stated above. It also presents objectives that guide the study.

## 1.2. Research Question and Research Objective

### 1.2.1. Primary Research Question

Why is there resistance to introducing an Information System in a tertiary care South African Public Hospital?

### 1.2.2. Sub-questions:

- What are the perceptions towards change using an information system?
- What are the reasons for change resistance to the introduction of an information system?

- What can be done to confront change resistance to the introduction of an information system?

### 1.2.3. Research Objectives

The research objectives of this dissertation are:

- To conduct a gap analysis between the current process flow (As-Is) and the proposed process flow (To-Be) as pertaining to the Acute Medical Ward and the hospital pharmacy;
- To understand the perceptions towards change triggered by an information system-supported process in a South African Public Hospital, based on the proposed business process;
- 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.

### 1.3. 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 (Bhattacharjee & Hikmet, 2007, p. 726). Finally, it will also provide a mapped process flow that hospitals can customize to help in reducing the amount of time it takes for the medication to get to the wards from the hospital's pharmacy.

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.

## 1.4. 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 to map the process. Due to the nature of the hospital business and the study's time constraints, only 16 hospital personnel were interviewed. Thus, the findings may be deemed as context dependent, and not generalizable to public hospitals (Flyvbjerg, 2006). Additionally, 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.

Lastly, since this was an inductive study which involved observations and interviews, there were observer biases and structural limitations during data collection. Battacherjee (2012) states that observer biases can be reduced but not eliminated, as both the interview and observation processes require the observer to be part of the process (Bhattacharjee, 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 this study is encouraged.

## 1.5. 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 to 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-centered, quality care, by adopting a theme of leadership, innovation, and change" (Patel, 2014, p. 5).

Although Groote Schuur Hospital is of similar caliber to The Red Cross War Memorial Children's Hospital, it 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).



Figure 1: "Groote Schuur Hospital - Observatory, Cape Town, Western Cape, South Africa," 2015)

### **Case Study Ward: Acute Medical Ward**

There are four Acute Medical Wards on G floor at Groote Schuur Hospital; G16, G17, G25, and G12. These wards are located two floors above the pharmacy on E floor.

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 assumed that the next time the same team is on duty, there would be capacity to admit more patients. However, this is not the case. Sometimes, patients who are discharged later in the day leave the hospital the following day. This is because they are unable to receive medication, as the pharmacy would be closed at the time of discharge. All the same, there are different non-medical reasons that lengthen patients' in-hospital stay.

Each ward has a set number of beds; G16 has 32 beds, G17 has 31 beds, G25 has 32 beds, and G12 has 30 beds. Often times, firms have more patients needing to be admitted than can be accommodated by that ward. This leads to them having to accommodate those extra patients in other acute medical wards. For instance, if G16 receives 5 new patients, but can only accommodate 3 patients, the other 2 patients are accommodated in any of the other 3 acute medical wards. This complicates patient management, as ward firms find themselves moving between wards to attend to their patients.

## Chapter 2: Literature Review

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### 2.1. Introduction

The literature review highlights 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. It will then conclude with a summary.

Literature was found primarily using these platforms: Google Scholar, Journal of Health Informatics in Africa, Journal of Management Information Systems, Sage Journals Online, Journal of Change Management, and Emerald. Other journal platforms were accessed through links provided by Google Scholar. The following primary keywords were used in the search accessing articles, books, conference papers, web pages, and journals: health informatics and change resistance, information systems and health care, business process modelling, health care process remodel, world health organization goals, service delivery, change management, patient satisfaction, South African health sector, employees, culture, and training. Resources were screened and selected based on the language of publication, the relevance of the abstract, the methodology used, the findings, keywords used, the journal it was published in, the references used, and the period it was published (2010 - 2016). Pertinent resources that fell out of period specified in the search criteria were still selected.

Change resistance is often the cause of failure in organizational change initiatives (Brown & Cregan 2008). Therefore, it is important to understand the background of healthcare service delivery, before understanding the cause of change resistance to information system-supported processes in healthcare.

### 2.2. Healthcare Service Delivery in South Africa

There are two health sectors in South Africa: public and private. The public sector services the majority of the population, and is characterized by delivering inefficient and ineffective service. Although it is mostly funded by 40% of the government's total health expenditure (Pillay, 2008), it is associated with patient dissatisfaction, disrespectful treatment by staff, long queues and waiting times, under-resourced facilities, being overburdened and overcrowded, as well as understaffed hospitals and clinics (Ataguba & Alaba, 2012; Harris et al., 2011; Komape, 2013; Mayosi et al., 2012; Weimann & Stuttford, 2014).

Conversely, the private sector services the minority of the population, and is characterized as highly developed, well-resourced and as delivering efficient services. Private sector healthcare is primarily funded by private health insurance companies and high-income earners, and is responsible for 60% of total health expenditure (Pillay, 2008).

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; Sekhejane, 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, implementing ethical values for health care professionals, regular surveillance, and gauges for improved health services” (Weimann & Stuttford, 2014, p. 10).

### **Need for Improvement**

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). 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).

To align with the national aim of improving service delivery, South African hospitals are investing resources into researching ways to improve the services they render, and thus increase patient satisfaction (Eitel et al., 2010; Hall et al., 2013). In the same scope, improving patient satisfaction through improving service quality in hospitals has become of importance globally, in research and in practice (Chan, 2013; Eitel et al., 2010; Hall et al., 2013).

### 2.3. Information Systems in Healthcare Service Delivery

In developing countries, a number of public health service providers have made efforts at reducing the inefficiencies and obstacles experienced, by using information systems as part of the process. An example of this is seen in a study conducted on fourteen public health service providers spread across three East African countries, Kenya, Tanzania, and Uganda. The study found that by replacing the paper-based health record method with electronic health records (EHRs), it facilitated better patient flow (Tierney et al., 2010).

Despite there being limited resources to implement EHRs, the successful implementation was owed to “local budgetary control, academic partnerships, and in-country IT-support” (Tierney et al., 2010, p. 374).

#### **Limitations to Information Systems in Healthcare**

Technological improvements such as electronic health records (EHR) and electronic prescriptions are often strongly resisted by physicians and those meant to benefit from it (Bhattacharjee & Hikmet 2007). User resistance is a limitation feared by most healthcare organizations. One cause for such resistance is by merely “rolling out” the new system without regard for the employees who will use it, as opposed to carrying it out, as a form of organizational development that is to become a normal part of the organizational processes (Berg 2001, p.154). Having limited resources is another limitation. Ironically, the already limited resources are wasted during inefficient processes (Weimann & Stuttaford, 2014). Low internet connectivity and a technology mismatch are primary limitations that most developing countries experience. This often results in limited access to health information and knowledge, and stem from a lack of financial investment in the health sector. Additionally, the high bureaucracy in South Africa contributes to restricting information systems implementation in the healthcare sector (Sambo 2015; Weimann & Stuttaford 2014). Moreover, low computer literacy skills among government hospital staff are a limitation, as it influences their willingness to use any new information system (Cline & Luiz 2013).

A change in the work culture could pose a stringent limitation, as research has shown that employees in more specialized fields are the most reluctant to adapt to change and accommodate new work practices (Rohleder et al. 2011). Lastly, implementation and electricity costs, system downtime which could influence process flows, and hospital staff having to do more work than expected due to adjusting to the new technology, are other concerns that could hinder implementing an information system into healthcare service delivery (Cline & Luiz, 2013; Goldzweig, Towfigh, Maglione, & Shekelle, 2009).

## 2.4. Change in Healthcare Service Delivery using Information Systems

The healthcare sector can be seen as the backbone of a nation's public health and economy. 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 (Bhattacharjee & Hikmet 2007). Moreover, information systems improve internal hospital processes, as they support medication administration, patient monitoring, and documentation systems (McMillan & Perron 2013).

### **Change using an Information System**

The process of introducing information communication technology (ICT) into a healthcare organization is said to be successful if the main goals are to experiment and to mutually learn from the process, as opposed to solely concentrating on planning and controlling the process (Berg, 2001; Lin et al., 2012). Additionally, it is advisable to ensure that the proposed technology is kept simple, relevant, and similar to, or can be built onto, the technology already in use, in order not to intimidate the employees who will be using it. Furthermore, this simplistic ICT should be introduced in a manner that adopts the current work culture, as opposed to creating new cultural paradigms (Lin et al., 2012; Rohleder, Lewkonia, Bischak, Duffy, & Hendijani, 2011). Although ICT enables developing countries to use their limited resources in a manner that improves health, health organizations are encouraged to use caution when introducing ICT (Spohr, Kay, Santos, & Takane, 2012).

Change leaders are to involve system users in the design, building, or introduction of the technology, by showing them the benefits associated with using the technology. In addition, they are to provide the necessary role-specific training needed to understand and efficiently use the technology, while encouraging a sense of ownership of the relevant role-specific changes. This will help reduce any resistance to change that may be encountered ("Change Management for Healthcare organizations," 2014; Jeffrey S. Rose, Clarence S. Thomas, Anthony Tersigni, J. Bryan Sexton, 2006; Lin et al., 2012; Spohr, Kay, Santos, & Takane, 2012). Lastly, introducing ICT into a health organization has been shown to eventually increase staff morale, and positively influence patient satisfaction, thus adding value to the organization (Rohleder et al., 2011).

## 2.5. Change Resistance

Change Resistance refers to unwarranted responses and behaviours that suddenly and blatantly arise during periods of organizational change, to sabotage change initiatives, with the intention of rendering them unsuccessful (Ford, Ford, & D'Amelio, 2008; McMillan & Perron, 2013; Wall, 2010). Additionally, resistant behaviours demonstrated by change recipients are described as destructive to the change process (McMillan & Perron, 2013). Feelings of frustration, disillusionment, and negativity towards the organization, are associated with change resistance, and often result in increased staff turnover (Brown & Cregan, 2008). For this study, change resistance will refer to a combination of “negative and disruptive behaviours” portrayed by hospital employees, with the intention of jeopardizing and nullifying change processes aimed at improving the organization. Such negative and disruptive behaviours may include, but are not limited to verbal and nonverbal actions; for example, cynical remarks, critically questioning and denying the need for change, eye rolling, knowing looks and smirks (Brown & Cregan 2008; Bernerth et al. 2011).

McMillan and Perron, (2013) stated that resistant individuals often make their position publicly known, and therefore act blatantly. Umiker (as cited by McMillan and Perron, 2013), agrees, and argues that resistant behaviour is the leading human factor contributing to change failure within organizations. However, Bateh, Castaneda and Farah, (2013) counter-argue by stating that “it is not resistance per se but the way organizations perceive resistance that either impedes or facilitates change” (p. 114). Ford et al., (2008), argue further from the change recipients' point of view, that the presence of resistance indicates that change recipients talk about change and its potential consequences. Furthermore, resistance presents an engagement opportunity for the organization, as it reflects a higher level of commitment (Ford et al., 2008). Moreover, it is important to provide change recipients with comprehensive information about the nature, process, and consequences of proposed change (Bateh, Castaneda, & Farah, 2013). Nonetheless, resistance to change has been identified by researchers, as a major challenge (Bateh et al., 2013; Burchell, 2011; Dent & Goldberg, 1999; Hashim, 2013)

### **Reasons for resistance**

Despite the expected benefits that come with using information systems in healthcare, resistance to change undermines those benefits and impedes on such change initiatives (Bhattacharjee & 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 et al., 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). Additionally, the duration of work experience in a specialized field or a particular department greatly contributes to change resistance (Bhattacharjee & Hikmet, 2007). According to Kotter and Schlesinger (as cited by Burchell, 2011), other reasons for change resistance include misunderstanding and lack of trust, and a low tolerance for change. Lastly, employees also resist change because of a miss-match of technology and minimal technical skills (Burchell, 2011; Weimann & Stuttaford, 2014).

### **Remedies for dealing with Change Resistance**

Introducing change can have a psychological impact on change recipients. Therefore, finding methods of positively introducing change, while minimizing and mitigating resistance is important (Lin et al., 2012). One way to minimize resistance to change in healthcare caused by information systems, is by understanding the reasons behind possible negative perceptions of the information system, and “how those perceptions are related to changes in processes and outcomes of their routine work” (Lin et al., 2012, p. 1966). Other remedies for change resistance to information systems in healthcare include having strong leadership to communicate the project vision and commitment, as well as customizing the system to fit the workflow. In addition, using well-respected senior employees and doctors to initiate the change and encourage others to see beyond immediate frustrations; and by capitalizing on those who were not exposed to the old system as much, and are enjoying using the new information system (Bhattacharjee & Hikmet, 2007).

On the other hand, change drivers could visit departments where change is being implemented, to ensure that all situational factors affecting implementation are sorted (Weiner, 2009). Although not advisable, one of the remedies is for change drivers to make and enforce pre-made decisions regarding organizational changes without facilitating communication between the staff and themselves (McMillan & Perron, 2013). This remedy, however, does not guarantee success, but instead fuels passive resistance.

On the contrary, participatory management styles help to decrease resistance to change (Brown & Cregan, 2008). “Managers must be prepared to talk candidly about the needs for change, otherwise fear and uncertainty will remain a prevailing element that can damage morale and prevent successful implementation of the desired changes at all levels of the organization” (Bateh et al., 2013, p. 114). Other remedies for change resistance include constant communication with change recipients, and adopting a change model that suits the organization and change process (Ford et al., 2008; Lunenburg, 2010).

Kotter and Schlesinger (as cited by Burchell, 2011), agree that communicating and educating change recipients about the reasons behind the change involving information technology, helps to reduce resistance. They further suggest that management be able to anticipate the amount of resistance that they will encounter, in order to prepare adequately, thus reducing the level of coercive methods needed to reduce resistance. Kotter and Schlesinger developed other methods to deal with resistance, such as involving stakeholders in the testing and implementation process, facilitation and providing support, negotiating and agreements, and using manipulation methods (Burchell, 2011). Similarly, change drivers should be sensitive to the timing of change initiatives. In that, change initiatives should be based on employees’ readiness to change (McMillan & Perron, 2013). Lastly, change initiatives should be done respectfully and fairly to cater for relational employees, and logical employees should be convinced that the long term benefits would compensate for the short-term discomfort experienced (Bateh et al., 2013).

## 2.6. 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. These change management activities often result in the users adopting the solution, because they understand the associated benefits (Infoway, 2013). Change is becoming an iterative process as organizations are shifting from only conducting change upon identifying a problem, to changing the way they conduct their processes to improve their overall efficiency (Massoudi et al., 2012; Omachonu, 2010; Ubbink et al., 2014). In view of this, it is imperative that when change is initiated, all stakeholders are involved and support the decisions made (Al-Abri, 2007; “Change Management for Healthcare organizations,” 2014; Eitel et al., 2010; Hall et al., 2013).

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, availability 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).

The change drivers should communicate the vision behind the change, the reason for the change, the effect it would have on the relevant employees and stakeholders, as well as any new expectations required of them (Al-Abri, 2007; Gunasekaran & Kobu, 2002; Hall et al., 2013). Additionally, change drivers are encouraged to incorporate any suggestions and recommendations, proposed by stakeholders and employees, as this could result in a greater willingness to accept the initiated change (Al-Abri, 2007; Nicholas, 2012).

### **Change Leadership**

There are two types of change driver approaches in change management leadership: top-down and bottom-up (Burchell, 2011). The top-down approach refers to instances where the "change is tied to a business strategy, is based on clear beliefs, and is part of a long term process" initiated and led by top management (Bjaalid et al., 2015, p. 6). The top-down approach presents more of an autocratic approach, and is more appropriate for IT changes involving a sense of urgency, where the change is less complex and must be implemented very quickly. Also, the top-down approach works best when little to no participation or collaboration is needed (Burchell, 2011; McMillan & Perron, 2013). Moreover, change leaders will have low anticipated resistance issues; therefore, the aim would be to overcome resistance, as opposed to managing it. Consequently, the resistance strategy would include rapid and direct communication, in addition to support while driving the IT change forward (Burchell, 2011).

On the other hand, the bottom-up approach refers to change initiatives led by workers within an organization, where their experiences and feedback decide what solutions will be chosen or discarded (Bjaalid et al., 2015). This approach is a participative and collaborative approach, and is viewed as more appropriate for IT changes that meet certain conditions.

These include changes that involve more complexity; where not all the information about the need for change and its advantages are available; where the implementation is not immediately needed, and where stakeholders' input and participation are needed (Burchell, 2011). These conditions often result in higher levels of anticipated resistance, resulting in the need to effectively manage change resistance, rather than overcoming it quickly (Burchell, 2011).

Therefore, the resistance strategy would include consistent communication; participation in implementing and testing the new system; training the stakeholders, as well as providing channels to receive and respond to their feedback (Burchell, 2011; McMillan & Perron, 2013). In addition to that is introducing a pluralistic remedy model that encourages “accountability and ownership for change initiatives” (McMillan & Perron, 2013, p. 28). Moreover, management is encouraged to provide grace periods between change efforts, which allow employees the chance to develop the required skills needed to adapt to the change, as they serve as a “stress reducing tactic” (McMillan & Perron, 2013, p.28).

### **Organizational Culture**

An organization’s culture is the combination of values and beliefs that influence how the people within an organization behave. The culture is created when their behaviour towards a phenomenon produces expected results, which reinforces the beliefs and values they hold (Infoway, 2013). Once attitudes and behaviours become part of an organization’s culture, it is difficult to change immediately. This is true for both positive and negative behaviours (Agocs, 1997). “Decreased optimism associated with change resistance is a result of a history of repeated organizational failures (McMillan & Perron 2013, p.29).

According to Brown and Cregan (2008), behaviours that arise from past negative experiences with change carry forward and influence future experiences of change, consequently emphasizing the need to be sensitive towards organizational culture. Sensitivity to the organizational culture is important, as there will be new organizational norms that require time to adjust (Jeffrey S. Rose, Clarence S. Thomas, Anthony Tersigni, J. Bryan Sexton, 2006). Instead of re-creating new cultural paradigms, change drivers should seek to adopt positive existing culture into the new process, to ensure a smoother transition for stakeholders, and be gracious towards negative culture practices (Mosher, 2014; Rohleder et al., 2011).

### **Training**

The World Health Organization's goal regarding the health workforce is for them to effectively and efficiently use the available resources to attend to the population’s needs. It is also imperative that the workforce be competent, responsive, and adequately supported (World Health Organization, 2015). In view of this, when introducing an IS-supported process, it is essential that training is provided for staff members to ensure their competency in using the proposed system (Pillay, 2008; Reeder, Hills, Demiris, Revere, & Pina, 2011).

This could contribute positively to their morale, as they will feel better equipped to do their job (Massoudi et al., 2012; Weimann & Stuttaford, 2014).

Moreover, training encourages an organization's culture of learning, and increases receptivity to change (Bush, Lederer, Li, Palmisano, & Rao, 2009). Studies showed that when an organization encourages a culture of learning during an information system change process, it significantly decreases the employees' resistance, and influences their commitment to change (Bush et al., 2009; Georgalis et al., 2015). Another study indicated that age was not a barrier when learning to use a new information system (Olajubu, Irinoye, & Olowokere, 2014). However, younger employees, physicians and administrators, were found to be more eager to learn and willing to change to use new "cutting-edge information systems" (Bush et al., 2009, p. 451).

## 2.7. Literature Review Summary

The South African health care system has issues of inadequate human resources for health and service delivery (World Health Organization, 2013). In addition, there is significant inequality in South Africa's health sector primarily due to the unequal allotment of resources between the public and private health sector, as well as managerial competencies (Ataguba & Alaba, 2012; Harris et al., 2011; National Department of Health, 2010; Pillay, 2008; World Health Organization, 2013). Consequently, this has resulted in obstacles and inefficiencies in the patient flow in public hospitals, which affect hospital processes, resources, as well as patient and employee satisfaction.

Studies indicated that introducing information systems into hospital processes often resulted in improved processes, increase efficiency, satisfied patients, and happy staff members (De Mast et al., 2011; Johnson & Capasso, 2012; Litvak & Bisognano, 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; Sambo, 2015; Weimann & Stuttford, 2014). Some solutions to facilitate the implementation of an information system in a healthcare environment include ensuring that the proposed technology is simple, relevant, and similar to the technology already in use. In addition, the change should adopt the current work culture, as opposed to creating new cultural paradigms (Rohleder et al., 2011). In addition, change leaders should involve users in the change process by showing them the advantages associated with the new technology. Also, providing role-specific training helps to reduce resistance, and encourages stakeholder buy-in (Bush et al., 2009; "Change Management for Healthcare organizations," 2014; Jeffrey S. Rose, Clarence S. Thomas, Anthony Tersigni, J. Bryan Sexton, 2006; Spohr et al., 2012).

# Chapter 3: Research Design and Methodology

## 3.1. Introduction

As aforementioned, studies indicated that introducing information systems into hospital processes often resulted in improved processes, increase efficiency, satisfied patients, and happy staff members (De Mast et al., 2011; Johnson & Capasso, 2012; Litvak & Bisognano, 2011). Therefore, it is important to understand the reasons for resistance to introducing such information systems. Hence the research question; why is there resistance to introducing an information system in a tertiary care South African Public Hospital?

This section presents the research philosophy and the research methodology chosen to answer the research question posed. The research methodology highlights the approach, strategy, and purpose of research. The research instruments, sampling strategy, and data collection will be discussed, before presenting the ethical concerns.

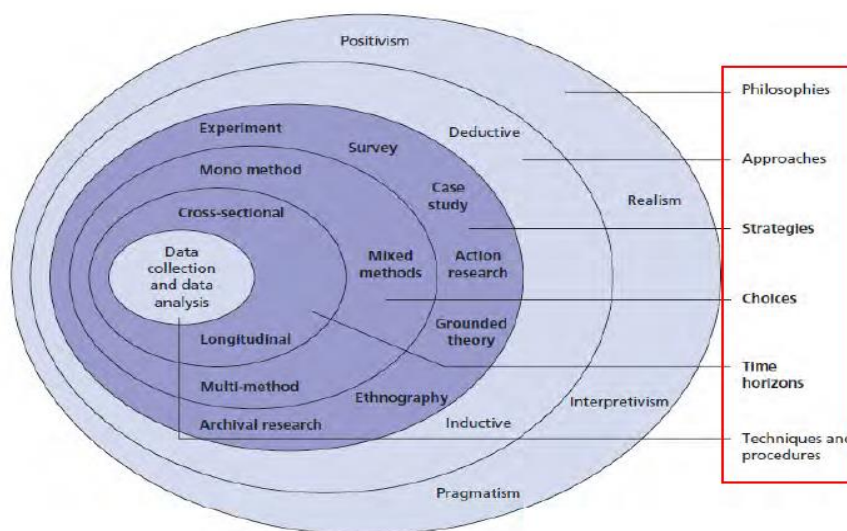


Figure 2: The Research Onion (Saunders, Lewis, & Thornhill, 2008)

The Research Onion in Figure 2 depicts the issues underlying the choice of research philosophy and research methodology (Saunders, Lewis, & Thornhill, 2008). Bhattacharjee (2012) describes a research design as “a blueprint for fulfilling the research objectives and answering the research questions” (p.24).

A research design contains the research philosophy, approach, research strategy, the choice of data collection method, the research time horizon, and the data collection and analysis techniques and procedures (Saunders et al., 2008). This section presents the research design and methodology according to the layers from the research onion.

## 3.2. Research Philosophy

According to Saunders, Lewis, and Thornhill (2008), the research philosophy adopted points to fundamental assumptions about the way the researcher views the world. These assumptions further guide the research strategy and methods chosen as part of that strategy (Saunders et al., 2008). There are two fundamental sets of research philosophical assumptions: ontology and epistemology (Bhattacharjee, 2012; Saunders et al., 2008). Ontology refers to “assumptions about how people see the world, i.e., does the world consist mostly of social order or constant change.” Epistemology refers to “assumptions about the best way to study the world, i.e., should we use an objective or subjective approach to study social reality” (Bhattacharjee, 2012, p. 21). Ontology and epistemology are interrelated in that one’s view of the world guides their choice in determining the best way to study the world. Therefore, it is important to state the ontological and epistemological stances chosen for this study.

### 3.2.1. Ontology: Subjectivism

There are two main ontological stances: objectivism and subjectivism (Saunders et al., 2008). The ontological stance chosen for this study is subjectivism. Subjectivism posits that “social phenomena are created from the perceptions and consequent actions of social actors” (Saunders et al., 2008, p. 110). Moreover, subjectivist research assumes that the best way to study social order is through the subjective interpretation of participants involved, mostly through interviews and observations (Bhattacharjee, 2012). Furthermore, researches that take on this stance often adopt an interpretivist epistemology (Bhattacharjee, 2012).

The next section details the epistemological stance chosen for the study.

### 3.2.2. Epistemology: Interpretivist

There are three main epistemological stances: interpretivist, positivistic, and critical realistic (Saunders et al., 2008). This research will use an interpretivist research paradigm. An Interpretivist paradigm assumes that access to reality is only through social constructions developed through shared meanings (Association for Information Systems & Myers, 1997).

This interpretivist stance proposes that the “best way to study social order is through the subjective interpretation of participants involved” (Bhattacharjee, 2012, p. 21). This helps in understanding the studied phenomenon from the participants’ viewpoint in the social or institutional context (Association for Information Systems & Myers, 1997). Moreover, this epistemological stance allows for studying context-specific processes through a case study methodology.

The stance also allows for the use of interviews, participant observation, and process observations, and assumes a more subjective viewpoint (Archibald, 2015; Association for Information Systems & Myers, 1997; Bhattacharjee, 2012; Cohen & Crabtree, 2006).

The next section discusses the chosen philosophical stance.

### **3.2.3. Philosophical Stance: Interpretivism**

“Interpretive methods of research in IS are aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context” (Walsham, 2009, pp. 4–5). The research aims to gain a deeper understanding of employees’ perceptions towards change, and any reasons behind change resistance to an information system-supported process. The research further aims to understand how to confront change resistance, through the experiences and organizational contexts of the participants. Based on claims by Walsham (2009) and what the interpretivist approach posits, this study adopted interpretivism as its philosophical stance.

This research paradigm was used in two similar studies. The first study by Rohleder, Lewkonia, Bischak, Duffy, & Hendijani (2011) used simulation modeling to improve patient flow at an outpatient orthopedic clinic, which is similar to using process mapping to improve business process flow. Although not the main objective, it is part of the process involved in analyzing change resistance. The second study by Cline & Luiz (2013) used an interpretivist paradigm to conduct a research case study on information technology systems in public sector health facilities in South Africa. This study also considered issues of change resistance to using information technology as part of the daily processes.

This study has similar objectives to studies aforementioned. This, as it will be looking at change resistance to an information systems-supported business process modeling initiative, and will involve mapping the current business process and the proposed IS-supported business process at the case study hospital, and analysing change resistance. Therefore, the interpretivism paradigm will be most appropriate. This research will not use a positivist paradigm because it is not trying to compare its findings to existing theory, nor test any hypothesis against theory, but rather to discover patterns and themes that will evolve from subjectively interpreting data collected to develop causal links to analyze change resistance at the case study hospital.

Additionally, a positivist paradigm assumes that reality is objectively given and can be measured by properties independent of the observer (Association for Information Systems & Myers, 1997; Saunders et al., 2008).

Although there are theories that could be used to test the findings against, the theory chosen will merely be used as a lens through which to understand and explain the findings (Bhattacharjee, 2012).

### **3.3. Research Philosophy: Methodology**

After considering the research philosophical stance chosen, the research methodology is required to practically apply the philosophy (Gray, 2014). Selecting a methodology is influenced by factors which include the perspective that the research is inclined towards; positivist or interpretivist (Gray, 2014). In addition, the researcher's view of theory; whether to begin with a theory (deductive approach), or whether the theory should emerge from the data (inductive approach) (Gray, 2014). Nevertheless, there are different methodology combinations available for research.

The research methodology used in the study is presented in the following section.

#### **3.3.1. Research Approach: Inductive**

There are two main research approaches: inductive and deductive. This study will adopt an inductive research approach (Bhattacharjee, 2012). The inductive approach allows the researcher to use interpretations to form correlations, causal links, and conclusions based on the observations and interviews conducted (Gray, 2014; Saunders et al., 2008). Furthermore, the inductive approach is mostly attached to the interpretivist philosophy (Saunders et al., 2008). Although Inductive research was traditionally conducted qualitatively, it can also be conducted through both quantitative and qualitative methods (Archibald, 2015). This was the case in the research by Cline & Luiz (2013), which investigated the use of information technology systems in public sector health facilities, and is thus appropriate for this study.

Although there are existing theories that have been used to explain change resistance to Information System, the deductive approach will not be used for this study. This is because the deductive approach begins with existing theory and mainly involves theory testing, which is not the objective of this study (Bhattacharjee, 2012; Gray, 2014).

The next section details the research strategy.

#### **3.3.2. Research Strategy: Case Study**

According to Saunders et al., (2008), "the research questions and objectives, the extent of existing knowledge, the amount of time, and available resources, as well as one's philosophical underpinnings" inform the choice of research strategy (Saunders et al., 2008, p. 141).

Moreover, the strategy chosen should enable the researcher to answer their research questions and meet their objectives (Saunders et al., 2008). There are different possible research strategies available, which include experiment, survey, case study, action research, grounded theory, ethnography, and archival research.

This study chose the case study research strategy. Case study research allows the researcher to “intensively study a phenomenon over time within its natural setting in one or a few sites” (Bhattacharjee, 2012, p. 95). A case study strategy was chosen partly because of the philosophical and methodological assumptions chosen. In addition, this strategy of study can be used with an interpretive research paradigm (Bhattacharjee, 2012). However, generalizability may not easily be made across case sites, but it can be improved by “replicating and comparing the analysis in other case sites” (Bhattacharjee, 2012, p. 43). Nonetheless, this research strategy allows for the discovery of other factors that potentially relate to the phenomenon of interest, by mainly providing answers to the questions ‘why?’, ‘what?’ and ‘how?’ (Saunders et al., 2008). Although the referenced studies (Cline & Luiz, 2013; Rohleder et al., 2011) that researched a similar phenomenon, conducted action research, Gray (2014) maintains that “the main action research medium is a case study” (p. 31), validating the use of a case study for this research.

### **3.3.3. Purpose of Research: Descriptive and Exploratory**

Bhattacharjee (2012) explains that there are three main research purpose classifications: exploratory, explanatory, and descriptive. However, Maxwell (as cited by Gray, 2014), adds interpretive as a fourth classification. The purpose of this research was twofold, descriptive and exploratory. On the one hand, descriptive studies are used to portray “careful observations and detailed documentation of a phenomenon of interest” (Bhattacharjee, 2012, p. 10). What's more, descriptive studies may be used to lay the foundation for exploratory and explanatory research (Saunders et al., 2008). In the case of this study, the descriptive section was used as a precursor for the exploratory section, as justified by Saunders et al., (2008). On the other hand, exploratory studies are useful when investigating relatively new phenomena (Bhattacharjee, 2012; Gray, 2014). Exploratory research helps the researcher to clarify their understanding of a problem (Saunders et al., 2008). These studies are most often conducted in three ways: “a search of literature, interviewing ‘experts’ in the subjects, or conducting focus group interviews” (Saunders et al., 2008, p. 140).

In view of this, the research was firstly descriptive, as it provided a detailed description of the gap between the current business processes and future proposed business processes based on observations and the mapped processes. Thereafter, it described reasons given for change resistance to the new information system.

This was done by carefully observing hospital employees' reactions and creating detailed records of this observation, in conjunction with a thematic analysis of interview responses.

Secondly, it is exploratory, as the research aims to explore possible methods to confront change resistance to information systems progressively, by finding "causal factors and outcomes of the observed phenomenon" (Bhattacharjee, 2012, p. 10).

### **3.3.4. Sampling Strategy**

Sampling refers to statistically selecting a "subset of the target population to observe or make statistical inferences for research purposes" (Bhattacharjee, 2012, p. 67). Bhattacharjee (2012) describes three sampling steps. Firstly, choose a target population. A target population refers to the unit of analysis (people, organizations, items) with the characteristics that the researcher wishes to study (Bhattacharjee, 2012). Secondly, select a sampling frame. The sampling frame is the accessible subset taken from the target population from where a sample can be drawn (Bhattacharjee, 2012). In cases where the sampling frame is not representative of the population at large, generalizability is not permitted. Lastly, choose a sample from the sampling frame using a well-defined sampling technique. What is more, Saunders et al., (2008) include a sample case, which refers to individuals participating in the research. This section presents the sampling strategy used in the current study.

#### **3.3.4.1. Sample and Target Population**

The target population for this research was tertiary public hospitals in South Africa. The sampling frame for this research were employees and medical interns from tertiary hospitals in the Western Cape of South Africa. A study on the challenges in the use of information technology in processing health information in resource-limited settings revealed that change resistance is an issue among employees and medical staff in hospitals in the Western Cape (Bimerew, 2015). The target sample organization chosen was Groote Schuur Hospital, while the group sample was the ward clerks, and medical interns from the Acute Medical Ward, the patient flow manager, and the head of the pharmacy at the case study hospital.

The ward clerks and medical interns were 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 (Bhattacharjee & 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. On the other hand, the patient flow manager, and the head of the pharmacy were interviewed to verify the mapped process flow.

Lastly, the Acute Medical Ward was chosen due to the patient flow issue that directly affects the lack of bed space (Patel, 2014). Therefore, the researcher believed that the target sample organization and group was most appropriate to provide the required data for the study. Furthermore, the hospital employees' and medical staff's answers would contribute to answering the research questions and meet the study's objectives.

#### **3.3.4.2. Sampling Technique and Sample Size**

Saunders et al., (2008) and Bhattacharjee (2012) agree that the two sampling techniques are probability and non-probability sampling. This research used non-probability sampling. With non-probability sampling, the probability of selection cannot be accurately determined (Bhattacharjee, 2012). In addition, non-probability sampling "provides a range of alternative techniques to select samples based on the researcher's subjective judgment" (Saunders et al., 2008, p. 233). Moreover, when intending to qualitatively collect data using interviews, the sample size is dependent on the research questions and objectives, as well as what can be done with the researcher's available resources (Saunders et al., 2008). This study adopted the purposive technique. Purposive sampling is used often in case study research with very small samples where information-rich cases are selected. It enables the researcher to use their discretion to select cases that will aid to best answer the research questions and meet the objectives. However, the findings from the sample cannot statistically be generalized (Saunders et al., 2008).

#### **Descriptive Statistics**

The sample for this study included ward clerks and medical interns from the Acute Medical Ward at Groote Schuur Hospital. The participants were between the ages of 20 years and 60 years, and included both males and females. The ward clerks were chosen based on the intention to include them in the proposed process. However, the medical interns were chosen based on their current involvement with the discharge medication process under review. In certain instances, the clerks gave similar answers for different questions. This could be attributed to their interpretation of the questions, or their command of the English language. It is worth noting that English is not their primary language, but Xhosa and Afrikaans. The interns were better versed in English, and thus better understood the questions posed. Nevertheless, purposive sampling was used for the ward clerks, as there are a fixed number of ward clerks available. As a result, there were a limited number of participants available to participate in the study.

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 (Bhattacharjee, 2012; Flyvbjerg, 2006; Gray, 2014).

Moreover, Saunders et al., (2008) suggest that 12 in-depth interviews are sufficient where the aim of the research is to understand commonalities within a homogeneous group. Figure 3 below illustrates the interview participants by gender.

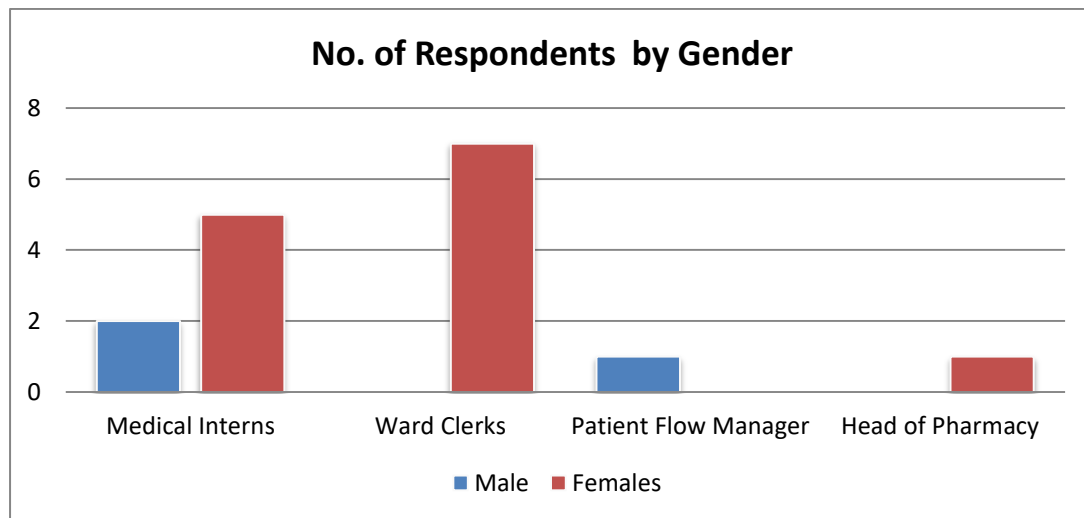


Figure 3: Interview Respondents by Gender

Seven ward clerks, seven medical interns, the patient flow manager, and the head of the pharmacy were involved in the process under review, and thus participated in the study. All the ward clerks interviewed were females. Two of the medical interns were males, and the rest were females. The patient flow manager was a male and the head of the pharmacy was a female.

The following details relate to the medical interns from Groote Schuur Hospital.

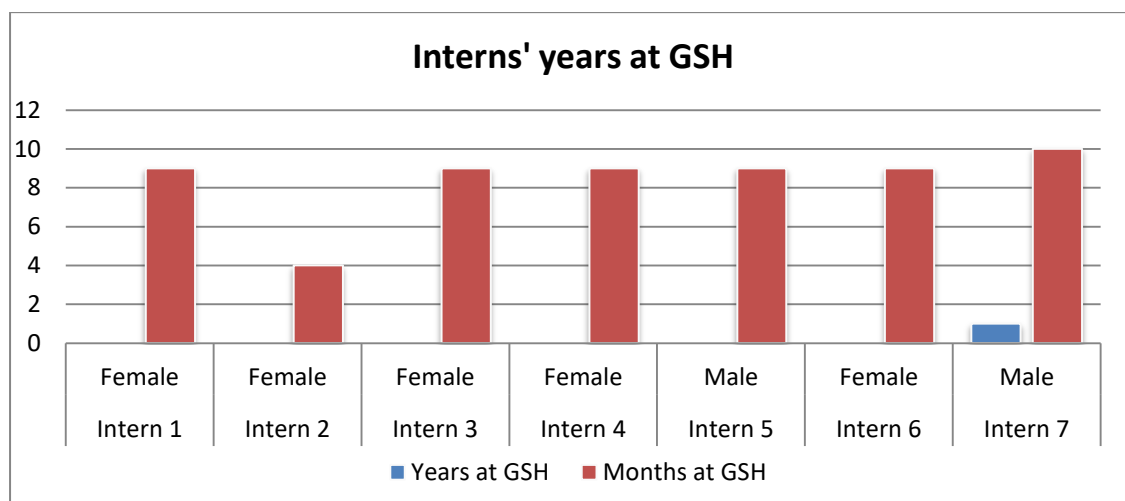


Figure 4: Medical interns' demographics

All the interns belonged to the 20 to 30 years age group. The interns' years of service all varied; one intern had been working at the hospital for a year and ten months, another intern for four months, while five interns had been working at the hospital for nine months.

All the interns indicated that they had used a computer before working at the hospital. Furthermore, they all indicated that they used a computer regularly at work, and were familiar with Microsoft applications such as Word, and Excel. With the exception of one intern, six interns indicated that they received training to use a computer. Lastly, four interns had not worked anywhere else besides Groote Schuur Hospital, while the rest had worked in other hospitals.

**The following details relate to the ward clerks from Groote Schuur Hospital**

After granting the researcher permission to interview the clerks, the ward clerks' manager informed the first four clerks about the interview. However, the manager did not inform the remaining three clerks.

The clerks were between the ages of 20 and 60 years. Five clerks indicated that they had worked at Groote Schuur Hospital for more than 20 years, while two clerks had worked at Groote Schuur Hospital for five and two years respectively.

Figure 5 below provides details relating to the clerks demographics.

<b>Ward Clerk</b>	<b>Age group</b>	<b>Years at Groote Schuur</b>	<b>Informed of Interview by management</b>
Clerk 1	41 – 50	27	Yes
Clerk 2	51 – 60	38	Yes
Clerk 3	41 – 50	5	Yes
Clerk 4	20 - 30	2	Yes
Clerk 5	51 - 60	21	No
Clerk 6	51 - 60	35	No
Clerk 7	41- 50	27	No

**Figure 5: Ward clerk demographics**

All the clerks indicated that they had used a computer before working at the hospital. Furthermore, they all indicated that in addition to receiving training to use the computer, they also used a computer regularly at work, and were familiar with Microsoft applications such as Word, and Excel. Finally, three clerks indicated that they had worked in the retail industry before working at Groote Schuur Hospital, while the others had never worked anywhere else.

## **Process Flow interviews**

Process flow information was gathered through observing the processes and by interviewing the patient flow manager and head of the pharmacy.

The next section details the data collection process and how information was obtained from the selected sample.

### **3.3.5. Data Collection: Mixed method**

Bhattacharjee (2012) lists four data collection methods: survey research, experimental research, case research, and interpretive research. While Saunders et al., (2008) list observations, interviews, and questionnaires.

Depending on the philosophical stance and research strategy chosen, any of these data collection methods can be used. Case study research is often conducted using a variety of data collection procedures (Creswell, 2003), such as interviews, observations, pre-recorded documents, and secondary data (Bhattacharjee, 2012). However, interviews are the most common data collection method (Bhattacharjee, 2012).

Interviews are a more personalized form of data collection that use the same protocol as questionnaires (Bhattacharjee, 2012). The main difference is that interviews may contain special instructions for the interviewer that enable the interviewer to note personal observations and comments during the interview inconspicuously (Bhattacharjee, 2012). This affords the interviewer the opportunity to gain clarity from the respondent by enabling for follow-up questions. Interviews could be conducted through face-to-face interviews, focus groups and telephone interviews (Bhattacharjee, 2012). Face-to-face interviews are more personal, and enable the interviewer to work directly with the respondent (Bhattacharjee, 2012). Furthermore, it allows for better observation of any reactions that respondents give to questions (Bhattacharjee, 2012).

In case study observations, “the researcher is a neutral and passive external observer and is not involved in the phenomenon of interest” (Bhattacharjee, 2012, p. 108). Observations supplement and validate interview data (Bhattacharjee, 2012). Moreover, it must be interpreted from the point of view of participants embedded in the social context (Bhattacharjee, 2012).

In view of this, this study used a mixed method approach to collect data. Data was collected qualitatively through in-depth, semi-structured, face-to-face interviews. The researcher was also the interviewer, and was thus a part of the measurement instrument.

The interviews were conducted in a consistent manner with all the respondents, such that steps followed in the research could be repeated in a duplicate study. Interviews followed these steps:

- The researcher explained the reason for the research, the process involved, and the content of the consent form.
- Participants signed the consent form.
- The researcher explained the mapped process and asked for feedback.
- The researcher showed the participants the information system intended to be used as part of the proposed business process, and explained how it would be set up in order for it to work.
- The researcher would demonstrate how to use the information system and allow the participant to also try it out. Once the participant was clear on how to use the information system and understood how it aided the process of requesting prescription medication, they were interviewed.

It is important to note that at each point in the process, the researcher allowed the participants the opportunity to ask questions.

Interviews were conducted from September 2016 to October 2016, and captured using a Huawei mobile phone voice recorder. Audipo, a smartphone application, was used to replay the recordings, as it allowed the researcher to change the speed at which the recordings played. This assisted the researcher when transcribing the interviews. Interviews were transcribed using Google Docs. Both the transcriptions and audio recordings were stored on the researcher's secure google drive account. Interviews with the medical interns were conducted in quiet hospital teaching rooms, and were not interrupted. However, interviews with the ward clerks were conducted at the ward reception area, as they were not allowed to leave their posts. As a result, there were interruptions during a few of the interviews.

Quantitative data was collected through on-site observations to gain a better understanding of the current discharge medication process, in order to accurately map the process. Process observations began in June 2016 and ended in October 2016. The process was observed bi-weekly, giving the researcher time to go through the following cycle: Observe the process, map what was observed, submit it for review, conduct verification interviews, make changes, observe again to ensure the researcher understood the process accurately. The mapped process was verified by interviewing the patient flow manager and the head of the pharmacy.

Additionally, the Discharge Planning for Acute General Medicine (G-Floor) document was also reviewed. Furthermore, on-site observations included face to face interactions with the ward clerks and medical interns.

The observed and proposed processes were mapped using open-source software, Lucid Charts. This is because it was free and reliable, the researcher knew how to use the software, and it was integrated with researcher's Google Drive account. All the interviews and observations were conducted between 10:30 a.m. and 4 p.m. during the week, based on the participants' availability.

The following section presents information about the data analysis strategy

### **3.3.6. Data Analysis**

Following from the research philosophical stance, this study adopted a qualitative analysis method. Qualitative data analysis is used to organize, structure, and give meaning to collected data (Hilal & Alabri, 2013). It is highly dependent on the researcher's analytic and integrative skills, as well as their personal knowledge of the social context where the data was collected (Bhattacharjee, 2012).

For the interviews, the study adopted a categorizing strategy, which involves coding and thematic analysis (Maxwell, 2009). Coding is the foundation of analyzing text-based qualitative data. It involves grouping together related words, phrases, or sentences, from interview transcripts or documents, to realize the connection between them (Hilal & Alabri, 2013).

This study used an inductive open coding method and an axial coding method. This is because no prior codes were used to direct the analysis. However, the codes were guided by the research objectives and question. Additionally, the categories formed were assembled into causal relationships that were used to explain change resistance (Bhattacharjee, 2012; Saunders et al., 2008). Sentiment analysis was used to capture attitudes towards change. Sentiment analysis is a "technique used to capture people's opinion or attitude toward a phenomenon" (Bhattacharjee, 2012, p. 117). Thematic analysis was used to group the coded sentiments. Thematic analysis entails searching for concepts that emerge as important when describing a phenomenon (Fereday & Muir-Cochrane, 2006). Nvivo, a qualitative data analysis tool, was used to analyze the data. It was chosen due to the advantages it presented; it aids to manage data and ideas, it enabled data queries, and allows for visual modeling (Hilal & Alabri, 2013).

For the observations that resulted in a modeled process, the chosen lens was the business process re-engineering framework, which uses business process modeling notation (BPMN). This is because “it is widely advocated for and used in hospital process redesigns” (Bigelow & Arndt, 2005, p. 20), and can be seen as an attempt to improve the overall running of a business through refining the efficiency and effectiveness of the business processes (Alsaigh, 2013). In addition, it entails rethinking and redesigning current business processes to attain sustainable improvements in quality, cost, service, lead time, flexibility, and innovation (Bigelow & Arndt, 2005; Gunasekaran & Kobu, 2002; Thompson, Seymour, & O’Donovan, 2009). Lastly, this framework is appropriate for the study. This is because it presents an activity-based analysis and workflow model which includes flow charts, process mapping, and simulations to aid in analyzing the business processes in order to identify activities that need to be improved (Gunasekaran & Kobu, 2002). This framework assumes that the business processes are manual, as it does not make provision for complex processes.

The following section presents information about the research instrument.

### **3.3.7. Research Instrument**

Questions for the interview instrument were adapted from a South African study conducted by Cline & Luiz (2013). This study examined the impact of hospital information systems implementation on service delivery, user adoption, and organizational culture. It mostly considered issues that arose from change resistance, and was thus suited for the purpose of this study. The study by Cline & Luiz (2013) covered questions relating to the respondents’ experiences and perceptions before and after the system installation, influences relating to end-user adoption, barriers to the effective functioning of the system, and the overall satisfaction with the computerized information system (Cline & Luiz, 2013).

Although the study used a questionnaire for data collection, a study by Kimaro and Nhampossa (2004) used a questionnaire to guide the interview questions asked. This justified the use of questionnaire questions to guide the interview questions. Furthermore, using an instrument that has already been used in a published study ensures the instrument’s reliability. The research instrument and profiling section can be found in the appendix.

The research instrument had two sections, a profiling section and the interview section.

The profiling section included attributes such as age, gender, prior computer use, prior computer training, regular computer usage at work, job title, years of service, and work experience in other industries.

These demographic attributes were chosen because a study found that there was a correlation between resistance towards healthcare information technology and age, job title, full-time work experience, and computer-related work experience (Bhattacharjee & Hikmet, 2007). Additionally, a study included the need for computer training as a factor to reduce change resistance to healthcare information technology (Cline & Luiz, 2013). Still another study described how employees' background employment experience might influence their intention to use a new information system (Bjaalid et al., 2015). Therefore, the researcher believed that the demographic attributes were appropriate for the study.

The interview section consisted mostly of questions from the study by Cline and Luiz (2013), in addition to three open questions. Questions from the study previously mentioned covered the following areas: perceptions of hospital information systems, perceptions of service delivery, perceptions of electronic health records, and the participants' willingness to adopt a new system. Some of the questions were rephrased using conversational language to suit the target sample group. The open questions covered the participants' view of the current process, the reasons for the lack of change, and ways to introduce change positively.

The next section discusses the time horizon of the study

### **3.3.8. Time Horizon: Cross-Sectional**

The time horizon of a study is independent of the research strategy or research method, and describes the period under which a phenomenon under investigation is studied (Saunders et al., 2008). There are two-time horizons, longitudinal and cross-sectional. This study adopted a cross-sectional time horizon. A cross-sectional time horizon describes research that studies a "particular phenomenon at a particular time" (Saunders et al., 2008, p. 155). Although case study research is often conducted longitudinally, most "case studies do not follow through a phenomenon in a longitudinal manner, and only present a cross-sectional view of organizational processes and phenomena" (Bhattacharjee, 2012, p. 96). This study would present change resistance to an information system-supported process as is occurring at present at the case hospital, Groote Schuur.

The following section discusses research ethical concerns

## **3.4. Ethical Concerns**

Access permission and ethics are critical to the success of a research project (Saunders et al., 2008). The researcher has to consider how they intend to get access to organizations to collect data, as well as any possible ethical concerns that could arise in relation to conducting the study (Saunders et al., 2008). This section provides details about access

gained to the case study hospital, as well as the different ethical concerns applicable to this study.

**Informed Consent:** Participants should agree to participate in the study. Thereafter, they must be made aware that their participation in the study is voluntary, and that they have the option to withdraw from the study without any negative consequences (Bhattacharjee, 2012). Before data collection commenced, consent was required from the Western Cape Department of Health Government. This is because Groote Schuur Hospital is a government hospital, and is under the provincial government's jurisdiction. When consent was granted, there were certain conditions that the researcher needed to abide by during the research process. These can be seen on the hospital consent form, found in Appendix A. Afterwards, the interview participants were asked to give their consent, after reading and understanding the content of the consent form, before being interviewed. Furthermore, before conducting interviews, the participants had to grant permission for the interview to be recorded. The interview participants consented to participate by signing the consent form. This is attached to the Appendix A. It must be noted that one ward clerk did not want to provide personal details on the consent form, and only gave initials, as they were afraid it could be traced back to them.

**Review board approval:** Before research at the hospital could begin, ethics approval from a university ethics committee or review board is required (Saunders et al., 2008). The researcher obtained permission from the University of Cape Town's Health Science Ethics Committee. The committee reviewed, accepted, and approved this study before the researcher started with data collection. This is attached to the Appendix B is the Ethics form.

**Confidentiality:** To protect participants' interests and future well-being, their identity must be protected (Bhattacharjee, 2012, p. 135). Participants were notified in the consent form, as well as at the beginning of the interview, that their identity, as well as any identifiable information would be kept anonymous during the process and after the research was conducted, unless required by authorities. In addition, respondents were notified about the voluntary nature of their participation in the research, and that although they were encouraged to answer all questions, they had the option not to answer certain questions, and they are allowed to end the process whenever they wish to do so. In order to protect participants' privacy and the confidentiality of their opinion, where possible, interviews were conducted in rooms separate from where the participants usually work. In such instances, only the researcher and the interviewee were allowed into the room during an interview.

In cases where interviews were conducted at the participant’s workstation, no identifiable words were used when referencing the interviewee. Once interviews were done, recordings were stored on the researcher’s Google Drive account, and were protected by a password.

**Feedback:** Upon completion of the research report, a copy will be made available to the participants and the hospital management. This is so 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.

### 3.5. Summary of Research Design and Methodology

This study set out to analyze change resistance to an information system-supported process in a South African Public Hospital. This chapter highlighted the research design and methodology adopted and used in the study. The study adopted an interpretivist stance, and an inductive approach. It used a case study research strategy that 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 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 was used to analyse the qualitative data collected. It was hoped that the chosen methodology would contribute to answering the research questions and meeting the research objectives.

Figure 6 below is a summary of the research design and methodology.

<b>Summary of Research Design and Methodology</b>	
<b>Research Philosophy</b>	Interpretivism
<b>Research Approach</b>	Inductive
<b>Research Strategy</b>	Case Study Research
<b>Research Purpose</b>	Descriptive and Exploratory
<b>Target Population</b>	Tertiary Public Hospitals in South Africa.
<b>Target Sample Organization</b>	Groote Schuur Hospital
<b>Target Sample Group</b>	Medical interns; ward clerks; patient flow manager; head of pharmacy
<b>Interview Sample size</b>	14 participants (7 medical interns, 7 ward clerks)
<b>Data Collection Technique</b>	Mixed Method: Interview and Observation
<b>Research Instruments:</b>	Profiling section: (Bhattacharjee & Hikmet, 2007; Bjaalid et al., 2015; Cline & Luiz, 2013)
	Interview: (Cline & Luiz, 2013)
	On-site Observation: (Discharge planning for Acute General Medicine (G-Floor) )
<b>Data Analysis</b>	Thematic and Sentiment analysis using Nvivo
<b>Time Horizon</b>	Cross-Sectional

Figure 6: Research Design Summary

## Chapter 4: Research Findings

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This chapter presents the study's research findings. These findings provide a foundation for understanding the results in the analysis and discussion section, in the next chapter. This chapter begins by presenting the findings that meet objective one in Section 4.1. Thereafter, the findings that meet objective two are presented in Section 4.2. The findings that meet objective three are presented in Section 4.3, before Section 4.4, which presents the findings that meet objective four.

### 4.1. Objective 1: Gap Analysis

The first objective is to conduct a gap analysis between the current business process (As-Is) and the proposed business processes (To-Be) as pertaining to the Acute Medical Ward and the hospital pharmacy.

Medication is requested daily from the pharmacy to treat in-patients, as well as for patients being discharged. The process under review relates to discharge medication. Currently, the actors involved in the process are the registrar, interns, runner, two pharmacy clerks, and the team of pharmacists. The emergency room (ER) is not directly part of the process.

The ER was included as it represents the activities that impact the discharge start time, which the registrar attends to before discharging patients. The nursing station is part of the process, as that is where T.T.O.'s (discharge patients prescription sheets) and Blue Boards (inpatient prescription sheets) are placed for collection. It can be assumed that all four Acute Medical Wards operate in the same way, and are serviced by the same ward firms, as per the description under the case study section. The Discharge Planning for Acute General Medicine (G-Floor) document, as well as input from the pharmacy clerks, ward clerks, interns, and the patient flow manager informed the mapping of the processes. Lastly, it is required that all T.T.O.'s and Blue Boards essential for the current day be sent to the pharmacy by 11:00 a.m. However, this is not always the case, due to the unpredictable nature of the hospital business.

#### 4.2.1. Current Process (As-Is)

Currently, the process of requesting medication from the pharmacy is said to begin at 2 p.m. the previous day. The process begins with the discharge prediction round and ends the following day between 3 p.m. and 4 p.m. when the medication is delivered from the pharmacy. Most of the processes that occur when requesting medication are conducted manually, using paper. The current process (As-Is) is depicted in Figure 7.

A narration of the process is found in Figure 8 The process tasks are numbered and the narration corresponds to the numbering. Please see Figure 7 below for the current process (As-Is) in Business Process Modeling Notation 2.0 Notation.

### ACUTE MEDICAL WARDS TO PHARMACY MEDICINE REQUEST (AS-IS PROCESS)

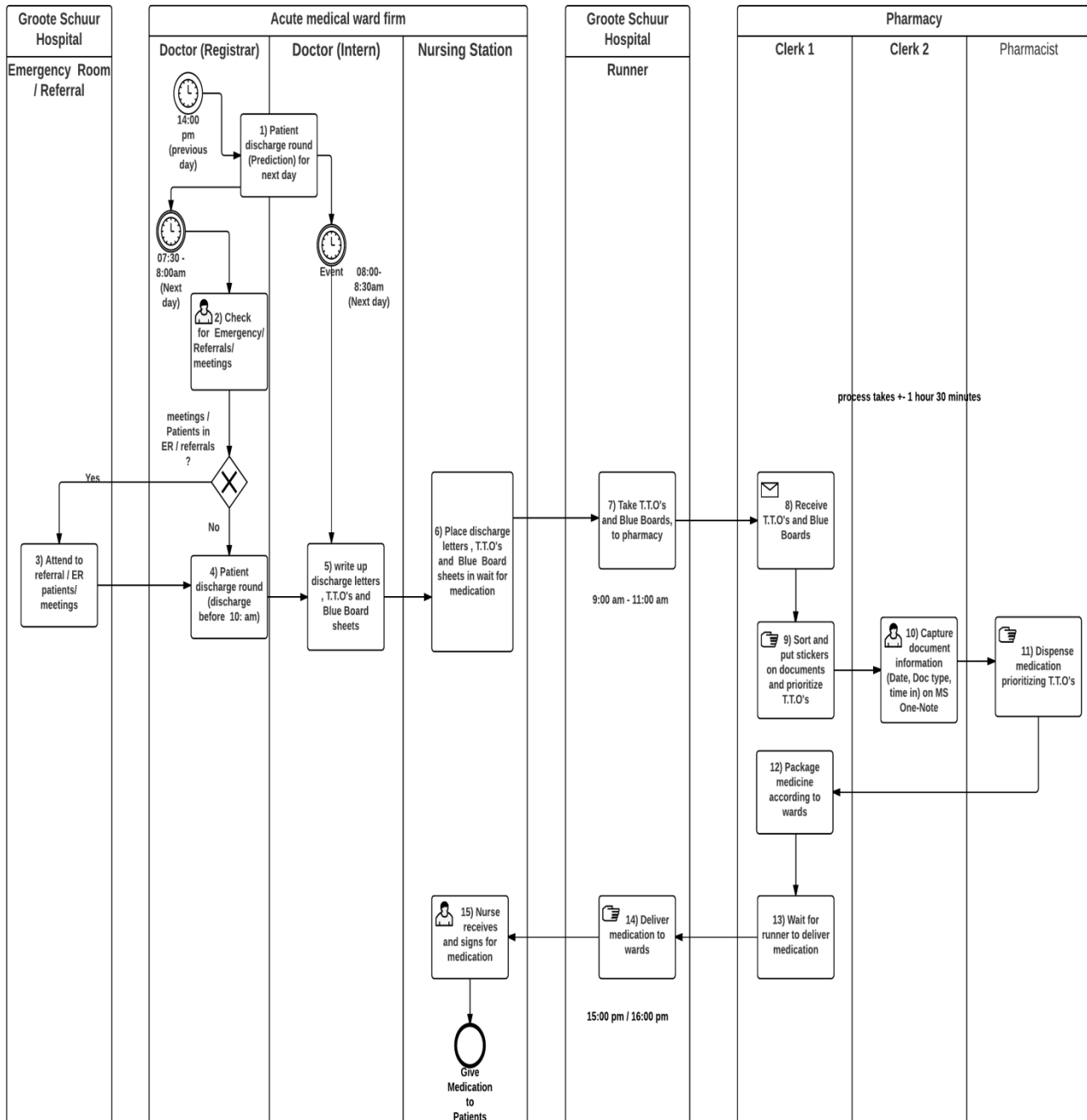


Figure 7: Acute Medical Wards to Pharmacy Medicine Request - As-Is Process

Task	Task Label	Narration
Task 1	Patient Discharge Round – Prediction (2 p.m. previous day).	This task begins at 2 p.m. the previous day. Here the registrar and the interns go through the ward to predict the patients who will be discharged the following day.
Task 2	Check for Emergencies, Referrals or Meetings (07:30 – 8:00 a.m. next day).	This task represents any activities that the registrar has to attend to before proceeding to discharge patients from the ward. It usually involves attending meetings, seeing referral patients, or attending to emergencies.
Task 3	Attend to Emergencies, Referrals, or Meetings.	Carrying on from the previous task, if there are activities to attend to, the registrar prioritizes those activities before going to the ward to discharge patients. If there are no activities, the registrar proceeds to discharge patients.
Task 4	Patient Discharge Round - Discharge (before 10 a.m.).	Depending on the time the registrar concludes the previous activities, they proceed to discharge patients. Ideally, all patient discharges should be processed by 10 a.m.
Task 5	Write up discharge letters, T.T.O.'s and Blue Board sheets.	Interns conduct this task regardless of whether the registrar is attending to other activities. The discharge letters, T.T.O.'s and Blue Boards are based on the patients identified for discharge during the prediction discharge round the previous day. Any new patients identified during the morning discharge round are also added to the group whose documents need to be prepared.
Task 6	Place discharge letters, T.T.O.'s and Blue Board sheets in wait for medication.	Once the interns have finished writing up the discharge letters, T.T.O.'s and Blue Boards, they are placed in a tray in wait for the runner's arrival. This tray is on the nursing station, often in the centre of the ward.
Task 7	Take T.T.O.'s and Blue Boards to pharmacy.	The runner usually arrives between 9:00 a.m. and 11:00 am to take the T.T.O.'s and Blue Boards from the nursing station to the pharmacy.
Task 8	Receive T.T.O.'s and Blue Boards	The first pharmacy clerk receives the T.T.O.'s and Blue Boards from the runner about 30 minutes after they were collected.
Task 9	Sort and put stickers on documents and prioritize T.T.O.'s	The clerk who receives the T.T.O.'s and Blue Boards sorts them by putting colour-coded stickers on the documents. Priority is given to T.T.O.'s.
Task 10	Capture document information on Microsoft One-Note	The second clerk captures the following details on Microsoft One-Note: Date, Time in, Ward, Folder number, Document type (T.T.O or Blue Board), and the Sticker Number. Then the clerk gives the T.T.O.'s and Blue Boards to the pharmacists.
Task 11	Dispense medication prioritizing T.T.O.'s	The pharmacists then dispense medication according to the requests on the documents, while prioritizing the T.T.O.'s. After dispensing the medication, it is given to the clerks.
Task 12	Package Medicine according to wards	The clerks package the medication according to the requests received.
Task 13	Wait for runner to deliver medication.	The medication is placed on shelves according to the respective wards. The medicine is kept there until the runner arrives to collect it.
Task 14	Deliver medication to wards	When the runner arrives at the pharmacy, the clerk gives the medicine to the runner. The runner delivers the medicine to the respective wards.
Task 15	Nurse receives and signs for medication	At the ward, the runner meets the Charge Nurse at the nursing station. The runner gives the Nurse the medication.

Figure 8: Narration of Current Process (As-Is)



Although the Clerks may not interact with the information system as part of the process under review, the findings from their interviews contribute to understanding their overall perceptions to change using an information system. Therefore, it is appropriate to include these findings as part of the study.

#### **4.2.2. Proposed Process involving Ward Clerks (To-Be)**

The proposed process of requesting medication from the pharmacy is estimated to end around 12 p.m. the following day. Most of the tasks that occur at the beginning of the process, from the discharge prediction round will remain the same. The proposed process does not eliminate the use of paper. Instead, it introduces the use of an information system at the ward level, which is integrated with the information system at the pharmacy.

The first proposed process (To-Be) is depicted in Figure 10. A narration of the process will follow Figure 10. Thereafter, a description of the proposed information system application will follow. The process tasks are numbered and the narration corresponds to the numbering.

Please note that there are tasks that occur concurrently. With the exception of task 8a and 8b, which are consecutive, all other concurrent tasks are depicted by the use of alpha-numerals.

## ACUTE MEDICAL WARDS TO PHARMACY MEDICINE REQUEST (TO-BE PROCESS)

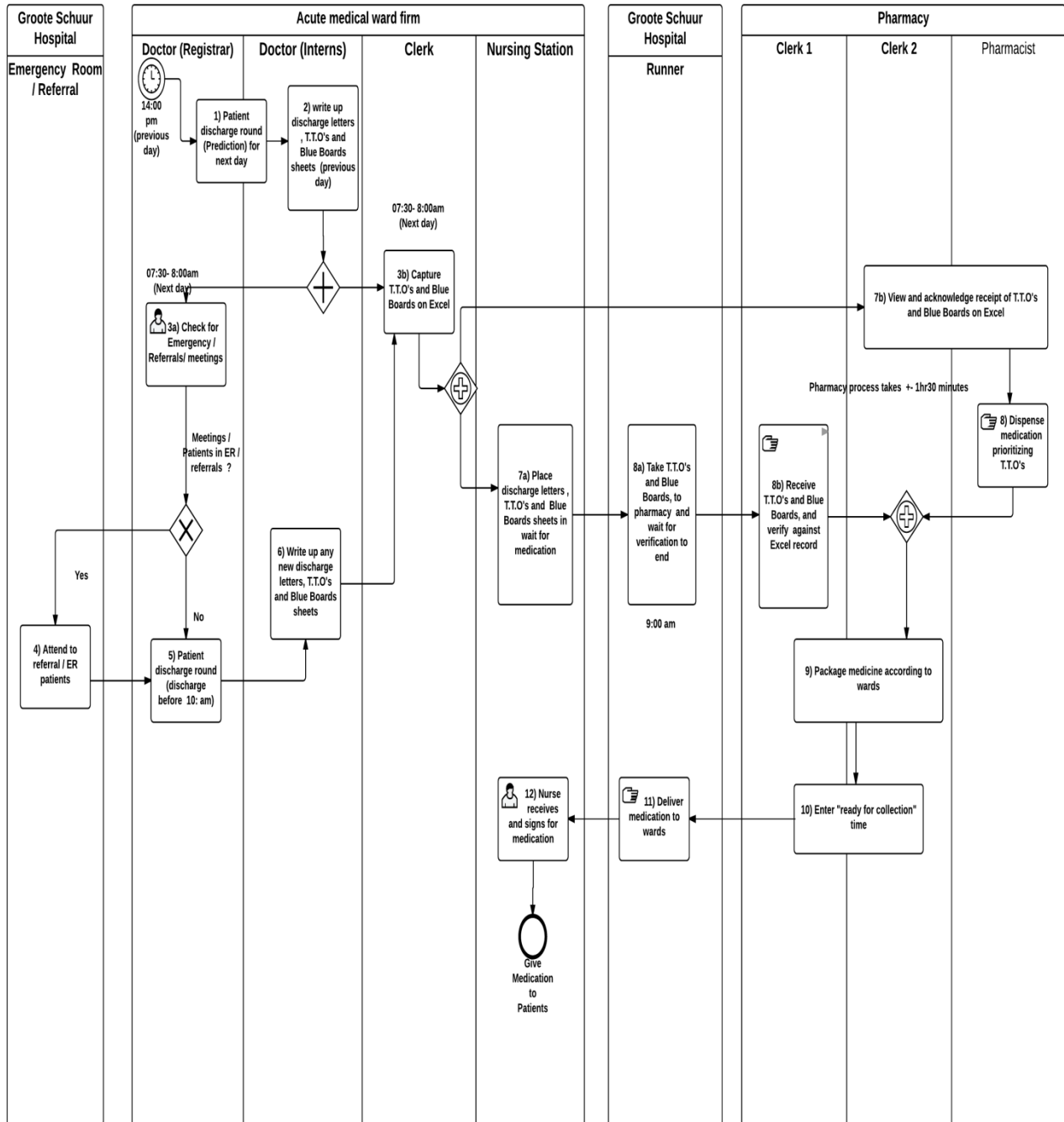


Figure 10: Acute Medical Wards to Pharmacy Medicine Request - To-be Process (Ward Clerks)

Task	Label	Narration
Task 1	Patient Discharge Round - Prediction (2 p.m. previous day).	This task begins at 2 p.m. the previous day. Here the registrar and the interns go through the ward to predict the patients who will be discharged the following day.
Task 2	Write up discharge letters, T.T.O.'s and Blue Board sheets (Previous day)	After the prediction discharge round, interns write up the discharge letters, T.T.O.'s and Blue Boards after all the patients are identified. By the end of the day the interns would give the T.T.O.'s and Blue Boards to the clerks
Task 3a and 3b occur concurrently		
Task 3a	Check for Emergencies, Referrals or Meetings (07:30 – 8:00 a.m.).	This task happens between 7:30 a.m. and 8 a.m. the next day. It represents any urgent activities that the registrar has to attend to before proceeding to discharge patients from the ward.
Task 3b	Capture T.T.O.'s and Blue Boards on Excel (07:30 – 8:00 a.m.).	While the registrar is attending to other activities, the clerks would capture the T.T.O.'s and Blue Board details on Excel by 8:00 a.m.
Task 4	Attend to referrals, ER patients or Meetings	If there are activities that need attention, the registrar prioritizes those activities before going to the ward to discharge patients. If there are no activities, the registrar proceeds to discharge patients
Task 5	Patient Discharge Round - Discharge (before 10:00 a.m.)	Depending on the time the registrar concludes the previous activities, they proceed to discharge patients. Ideally, all patient discharges should be processed by 10 a.m.
Task 6	Write up any new discharge letters, T.T.O.'s and Blue Board sheets	Any new patients identified during the morning discharge round are added to the group whose documents need to be prepared, and those documents are given to the clerks to capture (Task 3b).
Task 7a and 7b occur concurrently		
Task 7a	Place discharge letters, T.T.O.'s and Blue Boards in wait for medication	Once the clerks have finished capturing the T.T.O.'s and Blue Boards on Excel, they are placed in a tray on the nursing station marked "Out", in wait for the runner's arrival.
Task 7b	View and acknowledge receipt of T.T.O.'s and Blue Boards on Excel (Enter Time In)	At the pharmacy, the clerks would view the T.T.O and Blue Board details entered on Excel and acknowledge it by entering the "Time in" – the time it was viewed.
Task 8	Dispense medication prioritizing T.T.O.'s	The pharmacists dispense the medication according to the requests on Excel, while prioritizing the T.T.O.'s. After dispensing the medication, it is given to the clerks.
Task 8a and 8b are consecutive and follow from Task 7a		
Task 8a	Take T.T.O.'s and Blue Boards to pharmacy and wait for verification to end	The runner arrives between 10:00 a.m. and 10:45 a.m. and takes the T.T.O.'s and Blue Boards from the nursing station to the pharmacy. The runner waits at the pharmacy until they receive the medication.
Task 8b	Receive T.T.O.'s and Blue Boards and verify against Excel record	The pharmacy clerk receives the T.T.O.'s and Blue Boards from the runner. The clerks cross-check the details on the T.T.O.'s and Blue Boards against the details captured on Excel.
Task 9	Package medicine according to wards	The clerks then package the medication according to the requests received, and gives it to the runner.
Task 10	Record ready for collection time (time out)	After medicine has been packaged and is ready for collection, the pharmacy clerk enters the time on the system.
Task 11	Deliver medication to wards	The clerk gives the medicine to the runner. The runner delivers the medicine to the respective wards.
Task 12	Nurse receives and signs for medication	At the ward, the runner meets the Charge Nurse at the nursing station. The runner gives the Nurse the medication.

Figure 11: Narration of Proposed Process Solution involving Ward Clerks (To-Be)

## **The Proposed Information System Application: Microsoft Excel**

Using Microsoft Excel allows different people to work simultaneously on the same project. This happens by sharing a workbook file on a network location that the intended people have access. Although the owner or creator of the workbook is the only one who is able to make changes to the design of the initial template, the contributors are able to add functions based on what the owner enabled upon creating the workbook. Access restriction to the shared workbook is possible through a password, thus providing a level of security (Microsoft, 2016). Sharing a workbook on Microsoft Excel is straightforward and requires the user to follow a set of instructions, as found on the Microsoft Support website called “Use a shared workbook to collaborate.”

Concerning compatibility, all the computers in the wards are equipped with the same operating system and software applications as the pharmacy’s computer; Windows 7, Microsoft Office 2010, and Microsoft Office 365, which includes Microsoft Excel. Therefore, the current computers do not require any upgrades in order to use the proposed information system application.

The data captured and stored on Microsoft Excel is accessible by all the actors directly involved in the process. At the end of every week, the pharmacy clerk would create Excel worksheets for the following week, within the same Workbook. That entails them copying the format in Figure 12 below, onto the different worksheets. By making the pharmacy clerk the owner of the workbook, it allows them to control input fields. For instance, the ward clerk would not be able to fill the “Time In” or “Time Out” field, but the pharmacy clerk would be able to do so. Lastly, all the participants working on the worksheet would be able to see all the changes made, as well as the name of the person who made that change. All changes made would need to be saved by the person making them, in order for it to not be changed.

The design of the Excel Worksheet was such that it was similar to the physical document. Additionally, most of the default information such as the: Unit Ward, Department, Document Type, and the Ward Firm all use drop-down options. This was done in an attempt to create consistency and save time. However, the Date, Patient Initials and Surname, Folder number, Medication Requested, Time In, and Time Out need to be manually entered.



### 4.2.3. Proposed Process involving Interns only (To-Be)

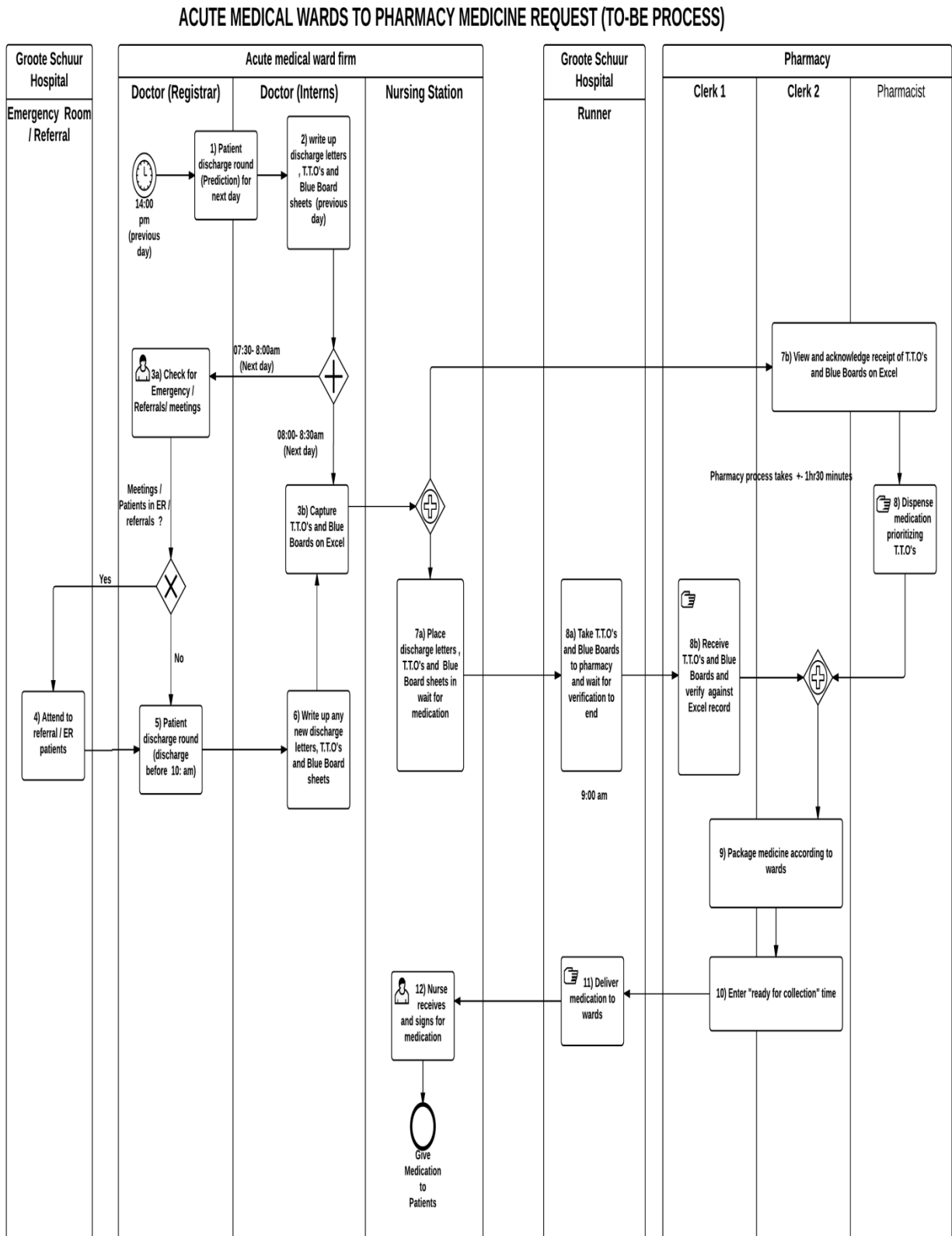


Figure 13: Acute Medical Wards to Pharmacy Medicine Request - To-be Process (Interns)

Task	Label	Narration
Task 1	Patient Discharge Round - Prediction (2 p.m. previous day).	This task begins at 2 p.m. the previous day. Here the registrar and the interns go through the ward to predict the patients who will be discharged the following day.
Task 2	Write up discharge letters, T.T.O.'s and Blue Board sheets (Previous day)	After the prediction discharge round, interns write up the discharge letters, T.T.O.'s and Blue Boards after all the patients are identified. By the end of the day the interns would give the T.T.O.'s and Blue Boards to the clerks
Task 3a and 3b occur concurrently		
Task 3a	Check for Emergencies, Referrals or Meetings (07:30 – 8:00 a.m.).	This task happens between 7:30 a.m. and 8 a.m. the next day. It represents any urgent activities that the registrar has to attend to before proceeding to discharge patients from the ward.
Task 3b	Capture T.T.O.'s and Blue Boards on Excel (07:30 – 8:00 a.m.).	While the registrar is attending to other activities, the interns would capture the T.T.O.'s and Blue Board details on Excel by 8:30 a.m.
Task 4	Attend to referrals, ER patients or Meetings	If there are activities that need attention, the registrar prioritizes those activities before going to the ward to discharge patients. If there are no activities, the registrar proceeds to discharge patients
Task 5	Patient Discharge Round - Discharge (before 10:00 a.m.)	Depending on the time the registrar concludes the previous activities, they proceed to discharge patients. Ideally, all patient discharges should be processed by 10 a.m.
Task 6	Write up any new discharge letters, T.T.O.'s and Blue Board sheets	Any new patients identified during the morning discharge round are added to the group whose documents need to be prepared by interns (Task 3b).
Task 7a and 7b occur concurrently		
Task 7a	Place discharge letters, T.T.O.'s and Blue Boards in wait for medication	Once the clerks have finished capturing the T.T.O.'s and Blue Boards on Excel, they are placed in a tray on the nursing station marked "Out," in wait for the runner's arrival.
Task 7b	View and acknowledge receipt of T.T.O.'s and Blue Boards on Excel (Time in)	At the pharmacy, the clerks would view the T.T.O and Blue Board details entered on Excel and acknowledge it by entering the "Time in" – the time it was viewed.
Task 8	Dispense medication prioritizing T.T.O.'s	The pharmacists dispense the medication according to the requests on Excel, while prioritizing the T.T.O.'s. After dispensing the medication, it is given to the clerks.
Task 8a and 8b are consecutive and follow from Task 7a		
Task 8a	Take T.T.O.'s and Blue Boards to pharmacy and wait for verification to end	The runner arrives between 10:00 a.m. and 10:45 a.m. and takes the T.T.O.'s and Blue Boards from the nursing station to the pharmacy. The runner waits at the pharmacy until they receive the medication.
Task 8b	Receive T.T.O.'s and Blue Boards and verify against Excel record	The pharmacy clerk receives the T.T.O.'s and Blue Boards from the runner. The clerks cross-check the details on the T.T.O.'s and Blue Boards against the details captured on Excel.
Task 9	Package medicine according to wards	The clerks then package the medication according to the requests received, and gives it to the runner.
Task 10	Record ready for collection time (time out)	After medicine has been packaged and is ready for collection, the pharmacy clerk enters the time on the system.
Task 11	Deliver medication to wards	The clerk gives the medicine to the runner. The runner delivers the medicine to the respective wards.
Task 12	Nurse receives and signs for medication	At the ward, the runner meets the Charge Nurse at the nursing station. The runner gives the Nurse the medication.

Figure 14: Narration of Restructured Process involving Interns only (To-Be)

The next section will present the interview results as they relate to the different research objectives. The results are organized with the clerks' responses before the interns' responses.

### 4.3. Objective 2: Perceptions towards Change

The second objective is to describe the staffs' perceptions towards change triggered by an information system-supported business process in a South African Public Hospital based on the proposed business process,

#### 4.3.1. Willingness to learn and use new system

This sub-section details both ward clerks' and medical interns' willingness to use the new information system application. They were asked the same questions; how they felt about learning to use the new information system application, and what their initial views were regarding using the information system application. Both group's responses were necessary to draw a comparison.

This section details ward clerks' responses.

#### **How do you feel about learning to use the new information system application?**

The majority of the clerks expressed their willingness to learn how to use the new information system application.

This is supported by the following quotation:

“I'm open to learning the new system” **(Clerk 1)**

However, one of the clerks indicated her unwillingness to learn how to use the application, because she felt that by learning how to use the application, she would automatically have to use it. Furthermore, most of the clerks indicated that although they are willing to learn to use the application, they were unwilling to actually use the information system application. The unwillingness to use the system was mostly because they did not want to be held responsible if medication was incorrectly captured. Additionally, they felt it was time-consuming, as it was not part of their job description. This is supported by the following quotations:

“I, for one, I don't want to take the responsibility because I don't understand the medication because I'm not a medical doctor. Moreover, I do not want anything to do with the medication. So, I don't think I'll do it.” **(Clerk 5)**

“Well, I don't have a problem with learning the new information, but I am not going to do it. It comes down to that, I will not do it. Because that is putting myself at risk and I am not! The doctors are covered by some HO company [insurance], and we're not.” **(Clerk 7)**

### **What were your initial views about having to use the information system application?**

There were varying perceptions about having to use the application. One of the clerks frankly stated they were reluctant to use the application. This is supported by the following quotation:

“This new information system, if it were up to me, I wouldn’t use it.” **(Clerk 5)**

Another clerk felt that it was essential to learn to use the application in order to remain relevant to the evolving technological age. However, it was stressed that they should only be taught to use applications that are relevant and necessary for completing their jobs. This is supported by the following quotation:

“Well, it’s good to learn. We are moving with times. But the fact is, we only need to learn to know it, if we’re going to use it. But because I flatly won’t do it, and many other clerks will not do it, what’s the point of learning it?” **(Clerk 7)**

The majority of the clerks expressed that they were willing to use the application if they knew it would benefit the patients. This is supported by the following quotation:

“If it will benefit the patients, I would be keen on learning to use the new system.” **(Clerk 3)**

In addition to that, another of the clerks expressed concern at the rate of implementation. This is supported by the following quotation:

“It depends on how fast it might happen.” **(Clerk 4)**

The next section details medical interns’ responses.

### **How do you feel about learning to use the new information system?**

All the interns stated that they felt good and were willing to learn how to use the new information system. This is supported by the following quotation:

“I don’t think it’s complicated, and I think it would be beneficial to everyone.” **(Intern1 )**

Another intern said that they enjoyed using technology as a means to improve their work. Moreover, most of the interns expressed that by learning to use the information system, it could benefit patients by ultimately improving patient flow. However, there were concerns raised by some of the interns that relate to the tradeoff between learning to use an information system, the duplication of work, and saving time. They suggested that the new information system application is integrated with the system being used to process discharges, called ECCR. This is supported by the following quotations:

“Consider whether it’s worth learning a new system versus how much time it’s going to save in the long run.” **(Intern 5)**

“So if there’s any way to link the ECCR and the new Information system application, as you are already typing in the medication in the discharge summary. it might be easier that way, otherwise you’re going to have to write up the medication three times.” **(Intern 4)**

### **What were your initial views about having to use the information system application?**

Two interns indicated that since changes are constantly taking place at the hospital, their perceptions regarding using this information system application is the same as it would be towards any other new change. This is supported by the following quotation:

“You kind of need to adapt to new things and change all the time.” **(Intern 7)**

Two other interns said they were keen to use the new information system application. This is supported by the following quotations:

“I am in support of anything that speeds up patient flow and frees more beds,” **(Intern 1)**

“It makes life a lot easier. As long as it works well, it would benefit the hospital.” **(Intern 3)**

On the other hand, one intern was concern about whether the application was feasible and would work in the hospital setting. The intern further alluded to concern for the medication being incorrectly dispensed. However, they pointed out that using the information system would allow them to identify and correct errors easier, when entering medication.

Finally, one intern felt that using the information system application could save time in the end. However, they were against the double work resulting from using the application. The intern felt that using the information system was unnecessary. Although it would result in shortening the waiting period for patients, it would not directly affect them, as they attend to other things while patients await their medication.

### **4.3.2. Perceptions of Information Systems**

This sub-section details both ward clerks’ and medical interns’ perceptions of information systems. They were asked the same question; how they felt about moving to a paperless system. Both group’s responses were necessary to draw a comparison.

This section details ward clerks’ responses

### **How do you feel about moving to a paperless system?**

All the clerks said they were not opposed to moving to a paperless system, mostly because they said using a computer is easier. This is supported by the following quotation:

“The computer is easier.” **(Clerk 5)**

One of the clerks pointed out the importance of backing up the information in case there was a problem with the information system. This is supported by the following quotation:

“No problem with that. There is paperwork, but at the end of the day, when these things [information system applications] crash, we revert to doing things manually. ”  
**(Clerk 7)**

The next section details medical interns’ responses.

### **How do you feel about moving to a paperless system?**

All the interns said they were in favour of moving to a paperless system. A few of the interns stated reasons in support of the paperless system. This is supported by the following quotation:

“I think that it’s much more transparent. Everyone can see problems in the system at any point in time. If you see that there’s a backlog and that there’s obviously an issue here, it is very much easier on an electronic system, where every step along the way, it gets logged or monitored” **(Intern 5)**

However, there were a few issues of concern raised, such as implementation issues, electricity and technology failures, confidentiality issues, and legal regulations.

This is supported by the following quotations:

“I would agree that a paperless system would be the way to go, but it needs to be done properly.” **(Intern 7)**

“I don’t think we’re ever going to get away entirely from paper, because every now and then systems do fail.” **(Intern 3)**

“..However, with that said, we need to revise the regulations with regards to paper-based systems because at this point in time, we still depend on paper - legally, but I am in favour of a paperless system.” **(Intern 5)**

### 4.3.3. Perceptions of using Information Systems

This sub-section details both ward clerks' and medical interns' perceptions regarding using an information system. They were asked the same questions; how they **found** working with an information system as opposed to a paper system; how they **felt** about using an information system instead of a paper system; and what effect not using an information system application would have on them. Both group's responses were necessary to draw a comparison.

This section details ward clerks' responses

#### **How do you find working with the information system rather than the paper system?**

All the clerks agreed that working with the information system was easier, and better than working with paper. The reasons they gave are, it is neater and faster; there is less paper involved; it is easier to read; and it is easy to correct mistakes made. This is supported by the following quotation:

“Paper tends to get lost, it tends to lie around, then you have to file and do all of that, so it's quicker actually, on the system.” **(Clerk 2)**

#### **How do you feel about using an information system instead of a paper system?**

All the clerks shared the same sentiment that using an information system is better than using a paper system. These are some of the reasons given: it is faster; it is easier; they are used to using an information system; it is neater and records do not get lost; and it is convenient as the information is available in one place and easy to find. This is supported by the following quotation:

“The information system is easier because we work with it all the time. In addition, it is easier to find things on the computer, than having to look through many files to find stuff. Using paper is messy and gets lost sometimes.” **(Clerk 7)**

#### **If you did not use the computer system, what effect would it have on you?**

A few of the clerks indicated that, not using the information system would slow down the process. This is supported by the following quotation:

“It would slow the process down” **(Clerk 3)**

Others said that they would not be affected by not using the information system. They would revert to using paper, as that is what was originally used. This is supported by the following quotation:

“Well then you would go back to paper - that's where everything started.” **(Clerk 6)**

**Between the information system and the paper system, which system would you rather use?**

All the clerks stated that they preferred to use the information system rather than the paper system. This is supported by the following quotation:

“I think the information system, you can save it, so you have proof. The paper system as well, you can keep it at a safe place, but if it is lost, it is lost. But sometimes, it (information system) shuts down.” **(Clerk 6)**

One of the clerks stated that they preferred to type, because of their handwriting. This is supported by the following quotation:

“Well, my handwriting is terrible, so I’d probably type.” **(Clerk 7)**

The next section details medical interns’ responses

**How do you find working with the information system rather than the paper system?**

Some of the interns found that working with the information system was easier, cost effective, timesaving, more efficient, and accurate. This is supported by the following quotation:

“I think it is more efficient. It is cost effective. It is time-saving, especially because it is instant. It would actually be easier.” **(Intern 1)**

Additionally, one intern suggested that the information system application use the list of medication accessed by the ECCR application, as it would contribute to making things easier. This is supported by the following quotation:

“What would be quite cool is if you guys would be able to add all the medications that are in SAP.” **(Intern 3)**

One of the interns admitted to being afraid of using technology. However, the intern agreed that the information system would make the process easier. This is supported by the following quotation:

“I’m going to be honest, technology scares me, but it is going to make it easier. So I think it is a very simple system, so it can’t be difficult to use.” **(Intern 4)**

Another intern alluded to the fact that his willingness to use the information system would depend on how well and thorough the implementation was, as well as the availability of resources. This is supported by the following quotation:

“If it’s a proper change over, by all means, otherwise, I’d prefer working with paper”  
**(Intern 7)**

Lastly, an intern insinuated that it was unrealistic for only an information system to be used when requesting medication. This was because of the legal issues surrounding the requirement for a doctor’s signature to be on the TTO before medication could be dispensed. This is supported by the following quotation:

“Essentially, there has to be a paper based system as well, because you need to have a signature on the TTO to make it a legal TTO..... a legal system (TTO) has to be signed by a doctor, or registered nurse, or pharmacist. You can’t just use an electronic system at this point in time.” **(Intern 5)**

### **How do you feel about using an information system instead of a paper system?**

There were mixed feelings about using the information system. Some of the interns were willing to use the information system instead of the paper system. They felt that using an information system would help to save paper; make work a lot easier; help to make dispensing medication safer as the pharmacists would be able to read prescriptions easily. This is supported by the following quotations:

“I think it’ll be a lot easier.” **(Intern 2)**

“It’s going to be a safer way of dispensing medication.” **(Intern 4)**

The other interns acknowledged that hospitals are moving more towards using information systems. This is supported by the following quotation:

“Information systems are the future of hospitals” **(Intern 5)**

However, they prefer working with the paper system instead of using the information system. One intern said the information system would only save time when dispensing medication for returning patients who required a number of different medications. Otherwise, the intern felt that using paper was quicker. This is supported by the following quotation:

“It is still quicker to write than to type.” **(Intern 5)**

Another intern said they would feel a bit uneasy about having to switch over to an information system, because with the paper they know that “whatever they write down is concrete” **(Intern 7)**. Still, another intern suggested that paper systems be used to back up the information system. The intern listed reasons that make it difficult to opt to work with the information system. Those reasons are, computers not starting up, and the internet and intranet not working properly. Lastly, they constantly have to use their mobile phones to check patient results when trying to use the Lab System.

These interns feel that information systems and the computers used at the hospital are unreliable. Nevertheless, they feel that the appropriate resources and the right context are needed for information systems to be useful and to contribute positively to processes.

**If you did not use the information system, what effect would it have on you?**

All of the interns felt that not using the information system would not have an immediate direct effect on them. This is supported by the following quotation:

“I think I’m so used to writing TTO’s that the system would just make it easier.”

**(Intern 4)**

However, most of the interns agreed that not using the information system would slow down processes and make their jobs more difficult. This is supported by the following quotation:

“When you are working in the health environment, people want things as fast as possible, otherwise they think you are not doing your job.” **(Intern 2)**

Two interns felt that not using the information system would eventually have an effect on them because there would be fewer beds available earlier, creating bed pressure.

**Between the information system and the paper system, which system would you rather use?**

Almost all the interns said they would rather use the information system as opposed to the paper system. This is supported by the following quotation:

“Although the information system is unreliable, it provides more accountability enabling us to know whether certain documents were filled.” **(Intern 3)**

Additionally, the information system helps to ensure data input accuracy, is less time consuming, can be used to backup information, and can help to improve patient management. Lastly, using the information system was seen as more hygienic than using paper.

On the other hand, one intern expressed an interest in using the paper system as opposed to using the information system. The intern stated that they understood the advantages of using the information system, but was not concerned about saving the patient time. The intern further said that they attend to other things while the patients wait for medication, and as such, are not affected. This is supported by the following quotation:

“The only time that we’re saving here is the time that it would have taken for the pharmacy to issue the medication, which is maybe 2 hours, plus or minus. Not to sound prejudiced, but that’s patient time, that’s not our [doctors/ interns] time. We are doing other things in that time space.” **(Intern 5)**

## 4.4. Objective 3: Root-Cause Analysis

The last objective is 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 business process in a hospital setting.

### 4.4.1. Perceptions of Service Delivery

This sub-section details both ward clerks' and medical interns' perceptions of service delivery. They were asked the same questions; whether there is a difference in service delivery when using the paper system verses the information system, and what result they thought the information system would have on staff morale. Both group's responses were necessary to draw a comparison.

This section details ward clerks' responses

#### **Is there a difference in the service delivery when using the paper system and when using the information system?**

Most of the clerks believe there is a difference in the service delivery when using the information system. They said the information system speeds up processes and saves time. 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. This is supported by the following quotation:

“No, I mean, for instance, the discharges - if you are waiting for a doctor to discharge you this morning, you are actually waiting for him, to come and fill in the information on the TTO. Nobody else can do it. The only time you can eventually go is when he has done it. So the information system doesn't really affect the service delivery.”  
**(Clerk 7)**

#### **What result do you think the information system has on morale in the workplace?**

The majority of the clerks said that the information system application would result in generally happier staff. They said that using the information system application would help to increase the rate at which patients were helped, thus make the patients happier, which would intern make them happier. This is supported by the following quotation:

“I think the patient would be happier to leave the hospital more quickly, and so will be the staff if we get the respect from the patients, the nurses, and the doctors.”  
**(Clerk 4)**

Another clerk suggested that the information system would help to make doctors' administrative work easier. Furthermore, some of the clerks said the information system would contribute to eliminating stress. This is supported by the following quotation:

“That will eliminate stress definitely, because it's very stressful at times when staff needs to answer on patients' medications. It will definitely relieve that stress”

**(Clerk 3)**

However, one of the clerks disagreed, and argued that the doctors would be happy and eager to use the information system application, whereas the clerks would be completely opposed to using it, thus negatively affecting their morale. This is supported by the following quotation.

“The doctors are very eager when it comes to learning new things. For us, I think we are going to not want to use it. And so, we are going to be up in arms.” **(Clerk 7)**

The next section details medical interns' responses

### **Is there a difference in the service delivery when using the paper system and when using the information system?**

Two interns felt that using an information system does not necessarily cause a difference to the service delivery, although it aids in making some processes easier. This is supported by the following quotation:

“I felt that when we prepare a discharge on the electronic system, it's actually easier to do it, than doing it on paper, because usually with paper it needs to be duplicated. But, I wouldn't say there's a difference in the service delivery. The job still gets done.”

**(Intern 7)**

An intern described some of the issues encountered with one of the information system applications currently used at the hospital. The intern alluded to the information system application being rigid and not specific enough to the different cases. Additionally, the intern explained that it was easier to write than to type when there was a high patient turnover. This is supported by the following quotation:

“It's not individualized, whereas with paper, you have the discretion. So that's where paper is actually better. In addition, with a high patient turnover, paper is much better, because you can prepare, for example, 50 discharges, on a paper template already stapled together with a carbon copy, and you can have 50 stacked up.” **(Intern 7)**

However, the rest of the interns felt that there was a difference in the service delivery when using the information system application. Some of the differences mentioned are, it saves time, is efficient, it is neater and people can read what is written easier. This is supported by the following quotation:

“I do think that this is more effective, because some doctors have appalling handwriting, and you won’t have the pharmacist sitting there trying to decipher what this person actually wrote. Back to the whole thing of people getting out of here faster - better service delivery” **(Intern 3)**

### **What result do you think the information system has on morale in the workplace?**

The majority of the interns were uncertain whether the information system would have an effect on staff morale. They mostly responded on the impact the information system application would have on certain processes, which would intern impact staff morale. This is supported by the following quotation:

“It’s going to make things much faster. Therefore, I think everyone will just be a bit happier and less overworked. It’s a very good system.” **(Intern 4)**

Two interns agreed that although some people’s workload would increase, using the information system would have a good result on morale. One of the interns said it could positively affect the nursing sisters. This is supported by the following quotation:

“.. on the interns, it increases the workload probably, but I do not think it will take that long, and we will manage the patients better, which will also make them feel better. Maybe it will be better for the Nursing Sisters morale because they are always the ones getting into trouble if the TTO was not sent down to the pharmacy. There’s a good result on the morale.” **(Intern 6)**

The other intern alluded to staff’s morale improving once they got used to using the information system. This is supported by the following quotation:

“I think some people view it as extra work to do. But I think ultimately, it will make everybody’s lives easier once everyone is used to it. So I think it would just be a matter of getting people used to the new thing and out of their old ways and habits, but i think once they know how to use it, it would be pretty decent.” **(Intern 3)**

Conversely, one intern said that there might not be a difference in the morale, due to the constant change occurring at the hospital. This is supported by the following quotation:

“I don’t think there will be much change. Like I said, there are always new things happening, new changes.” **(Intern 7)**

#### 4.4.2. Perceptions of Record Management

This sub-section details both ward clerks' and medical interns' perceptions of record management. They were asked the same questions; what they thought about the time spent entering information, as well as the duplication of information; how the information system affected record management and the number of records that get lost; and which system, between the information system and the paper system, they thought organizes patient information better. Both group's responses were necessary to draw a comparison.

This section details ward clerks' responses.

##### **What do you think about the time spent entering information, as well as on duplication of information?**

All the clerks said that duplication is necessary as it helps as a backup. Moreover, they currently create duplicates of documents, using carbon paper or by printing twice. For that reason, having duplicate information, on the application and on paper, is not an issue. This is supported by the following quotation:

"I think duplication is fine. It is more work, but somewhere you must have duplication. It is like having a carbon copy." **(Clerk 6)**

Regarding time, the clerks feel that entering information will take long because of their lack of knowledge about medicine. This is supported by the following quotation:

"We are not familiar with most of the medication, so it will take long for us. The medication that they use regularly, we know, but there are other medications."

**(Clerk 1)**

##### **How does the information system affect record management and the number of records that get lost?**

Most of the clerks feel that the information system would improve record management by making it more efficient. This is supported by the following quotation:

"I think it is more efficient than having a whole lot of books, or papers, files or things like that. It is more efficient. You can have it on the system, and you can print it."

**(Clerk 5)**

One of the clerks said that the information system did not affect record management, but served as a way to backup information. Another clerk said the information system's effect on record management depended on what was captured by the user. This is supported by the following quotations:

“Well, it can’t affect it. All you can do is duplicate it so that, should the physical records get lost, it is on the information system.” **(Clerk 7)**

“It depends on what you put on, you as an individual, what you put on the system. If you don’t capture it on the system, the system won’t know.” **(Clerk 4)**

**Between the information system and the paper system, which system do you think organizes patient information better?**

All the clerks agree that the information system organizes patient information better. Some of the clerks explained that the information system allowed them to edit and save changes easier and neatly. This is supported by the following quotation:

“The information system organizes patient information better, because you can change it easily and save it.” **(Clerk 6)**

The next section details medical interns’ responses

**What do you think about the time spent entering information, as well as on duplication of information?**

A few of interns felt that the time spent entering information was not an issue. One of the interns felt that the time spent entering information was actually less than the time they spent writing out TTOs. Furthermore, these interns were in support of the duplication of information, and further suggested that the system application be linked with the current ECCR system to avoid repeating the same task. This is supported by the following quotations:

“I think the time spent would be less than writing. And I think the duplication is actually a good idea, because you always need proof to correlate between the two, because you could make a mistake on the written TTO.” **(Intern 2)**

“I think it would just be easier if you could use something that’s similar to the ECCR, or if they take the medication part of the ECCR away and attach this [information system application], it might be easier, because then you only type it out once, somewhere along the line.” **(Intern 4)**

One the other hand, a few interns felt that using the information system application was time-consuming. In addition, although necessary, they felt that the duplication of information was a nuisance, tedious and a waste of time. This is supported by the following quotations:

“The time spent on entering information is a nuisance. Now you’re tripling the amount of time it takes to see a patient because of this entering on an electronic system, which is not realistic.” **(Intern 5)**

“The duplication of information is a bit tedious, but I don’t know if we can exclude the stage of doing the formal TTO because it’s a legal document.” **(Intern 6)**

### **How does the information system affect record management, and the number of records that get lost?**

One intern said it was difficult to say how the information system would affect record management, but agreed that it would increase accountability. All the same, the rest of the interns alluded to the information system improving record management by providing accountability and transparency. This is supported by the following quotation:

“I think with the information system, there’s more accountability. There is an electronic record of whether it was done, whereas, with paper, it is a lot easier to misplace. It gets crumpled up; it gets chucked in the bin.” **(Intern 3)**

Additionally, all the interns agree that by using the information system, fewer records would get lost. Furthermore, it is easier to search for records on an information system application as opposed to going to the records room or searching through folders. This is supported by the following quotations:

“Well, it will obviously improve, even if you did lose the hard copy of the TTO, they would see it was entered in the morning on the information system.” **(Intern 6)**

“In general, to search through a folder for a particular result or a particular department’s notes is always a nightmare, so if you can access that information on an online system, then it will be easier.” **(Intern 7)**

### **Between the information system and the paper system, which system do you think organizes patient information better?**

All the interns agreed that the information system organizes patient information better than the paper system. Furthermore, one of the interns pointed out that the application’s rigid design is limiting. The intern alluded to the paper system as being flexible in that it allowed them to capture details as they saw fit.

This is supported by the following quotation:

“Definitely think the information system organizes patient information better. But the information system is limited by the structure that you put on it.....”

So, I think that the paper-based system is more fluid, is more flexible, but an electronic system has more potential to be detailed and structured, but it can also be limiting.” **(Intern 5)**

#### **4.4.3. Perceptions of the Current Process**

This sub-section details both ward clerks’ and medical interns’ perceptions of the current process in place. They were asked about how happy they were with the current way processes are done. Both group’s responses were necessary to draw a comparison.

This section details ward clerks’ responses.

##### **How happy are you with the current way processes are done?**

Most of the clerks indicated that they met processes done a certain way and just adapted to the way things were. This is supported by the following quotation:

“It’s been done for ages that way. You know, if there were changes, it was slight changes, but not major changes. People have adapted to it. Then every time something new comes, we adapt to that as well, - we learn it, we adapt - and that is just the way we are. In addition, if you are too old and you cannot do it, then you get out of here! That’s it!” **(Clerk 7)**

One of the clerk said that they were unhappy with the current way things were done, because it took long and contributed to inpatients not leaving the wards on time, resulting in beds being occupied that could be used to admit emergency cases.

The next section details medical interns’ responses

##### **How happy are you with the current way processes are done?**

One of the interns expressed that they kept to the status quo. This is supported by the following quotation:

“I suppose it’s something I’ve just gotten used to.” **(Intern 1)**

Three interns said they were not happy with the way processes were currently conducted. One of the interns said they are aware that the system present is the only system available. Furthermore, the intern alluded to not knowing some of the other people involved in the process. This is supported by the following quotation:

“I’m not entirely happy, but it’s the only system currently, so you have to make it work. Sometimes, we even write out the TTO and it somehow goes to the pharmacy, or it somehow gets lost. There is always a break in communication somewhere.”

**(Intern 2)**

Another intern expressed that the reason for not being happy stemmed from being forced to use an electronic system. This is supported by the following quotation:

“I’m not particularly happy with it because there is a very clumsy electronic system which we’re being forced to use. Currently, I think everything that we do is being done to try and streamline the processes, but there’s a few annoying systems.”

**(Intern 5)**

Finally, the other three interns alluded to being content with the current way processes were done. Most of the reasons given were attributed to their work ethic; they completed tasks on time, or they found it easy to use the ECCR system to discharge patients. This is supported by the following quotation:

“For me it’s fine. I’m a bit of an OCD [obsessive compulsive disorder] type of person, so my notes and prescriptions are done quite thoroughly.” **(Intern 4)**

“I must say, the ECCR thing does make the discharging a bit easier.” **(Intern 3)**

In addition to being content with the current way the processes were done, one of the interns raised a concern that medication could not be released without a signed TTO. This is supported by the following quotation:

“It is a release protocol, you can’t just get any medication without a signed TTO. But I don’t have any problem with it; it doesn’t affect me in any way.” **(Intern 7)**

#### **4.4.4. Perceptions of Change in the Hospital**

This sub-section details both ward clerks’ and medical interns’ perceptions of change in the hospital. They were asked why they thought change had not taken place at the hospital, and what they thought could be done to successfully introduce change. Both group’s responses were necessary to draw a comparison.

This section details ward clerks’ responses.

##### **Why do you think change has not taken place at the hospital?**

According to two of the clerks, positive change has taken place in the hospital. This is supported by the following quotation:

“But actually, in the medical ward, change has taken place, like one of the doctors in the medical ward implemented that ECCR system, and it’s much better. Everybody was positive.” **(Clerk 1)**

However, the rest of the clerks feel that change has not taken place. They mostly quoted reasons such as a lack of Management involvement, a lack of communication between management and staff, and a top-down implementation approach. This is supported by the following quotations:

“I don’t want to say too much. However, they [management] will not listen to us. We are just told what to do by management. I don’t want to complain.” **(Clerk 5)**

“They want to dictate and tell people how, where and when, and bring things. Everyone wants to bring new things in, but they do not care about who must do it. When they come up with something, it is decided among those few, and then the actual thing happens lower down [the hierarchy], not with them. Whenever something is introduced, they just introduce it. They do not find out how we will cope, or what is involved. They just come up with a plan, and we must just fall in with it. So management needs to come around and check and make sure that things are in place.” **(Clerk 7)**

Additionally, the clerks felt that fear of change, and people not given the choice to decide whether or not they want to change, contributed to the employees’ reluctance to change. Lastly, the clerks felt that employees who have worked at the hospital for many years found it difficult to adapt to the change, despite the training provided. They added that younger employees were more advanced and adapted to technological change faster than employees who were relatively older. This is supported by the following quotation:

“People have been doing the something for 30 years, so there’s a lot of long stay, I won’t say old, but long service people, who are just set in their ways, so change for them, they will be a bit reluctant.” **(Clerk 3)**

“The new generation are computer and electronic kids. They are more advanced. Nevertheless, we get there. We take our time, but we get there, though we take a bit longer.” **(Clerk 4)**

### **What do you think can be done to successfully introduce change?**

All the clerks emphasized the importance of communication between management and the people affected by the change. They said that management should try to include staff in decision making, to allow them to know what will be expected from them. Additionally, they raised issues regarding mutual respect and intentionally listening to each other. Furthermore, one of the clerks said that people should be willing to help each other when help is needed. Another clerk mentioned that the staff should be given the choice to decide whether they wished to adapt to the change, instead of forcing new changes on them. Moreover, where people decide to adapt to the change, management should be patient with long serving staff members, as they are used to doing things a certain way. Lastly, people should be given time to adjust to the change. This is supported by the following quotations:

“I think communication with everyone affected by the change.” **(Clerk 1)**

“I think it’s important to allow people the choice whether they want to change or not. Instead of forcing new changes or improvements on them.” **(Clerk 4)**

“To introduce change successfully, you would need to be patient with the people who have been working here for so many years, for them to welcome the change.”

**(Clerk 3)**

“I think if you give employees time to adjust, change could be successfully introduced.” **(Clerk 2)**

With regards to job-related changes, some of the clerks felt that their job descriptions should be changed or updated to include the change. This is because they felt that when change was introduced, they were often given more work in addition to the work they currently have, but the new work was not stated as part of their job description. Finally, where new software is implemented, it is important that everyone who is to use the system has access to it. This is supported by the following quotation:

“It comes down to getting the job description, because each time they come up with something, the person already doing that work is going to have the new work added to them. Also, make sure that everyone has access. Make sure these things are working, so that no one has to struggle to get around. So access to resources in everything that we do.” **(Clerk 7)**

The next section details medical interns’ responses

### **Why do you think change has not taken place at the hospital?**

Two interns opposed the question and stated that change had been taking place in different departments at the hospital. One of the interns alluded to change not being the main issue, but the lack of staff. This is supported by the following quotations:

“Change is taking place at the hospital; there are a lot the wards, many people, and many of the departments are moving towards electronic systems. The pharmacy itself is also working towards using electronic systems.” **(Intern 5)**

“I think there is change. The hospital is constantly changing and constantly upgrading the way we do things - improvements in the service delivery and things like that. Ultimately, it boils down to the amount of staff. Our main problem is staff.” **(Intern 7)**

On the other hand, five interns agreed that change had not taken place in the hospital. The following are some of the reasons given: the staff is accustomed to the current way things are done, humans are generally resistant to change, the individual's age and their years of service influence their willingness to change. In addition, there is a lack of funding, the technological resources available are incompatible with certain proposed technological changes, and not all departments have the same resources. Lastly, there are strict regulations regarding patient records, and there is a general lack of knowledge of reporting structures. This is supported by the following quotations:

“Firstly I think it's all about comfort; in that, once you get used to something and it works for the majority of the time, you don't want to change. In addition, there are people who have worked here for a very long time, and by showing them a new system, they do not agree with it. With us, interns, it would be fine because we are always willing to change. But nobody has taken the initiative to change.” **(Intern 2)**

“Probably, a lack of funding, maybe there's just an unwillingness to change. The computers seem relatively new, but then I would imagine that they would probably need a little bit of an upgrade in order to facilitate the kind of intranet database facility you are trying to look at. In addition, there are not computers in every department. I think it is also a lack of centralization as well. No one really knows who is in charge of it.” **(Intern 3)**

### **What do you think can be done to successfully introduce change?**

The interns provided similar answers to this question. Most of the interns felt that providing training would be one of the best ways to introduce change successfully. Other methods include communicating with those potentially affected by the change, changing the job description to incorporate the new change, having a pilot project and publicizing the results as a way to encourage buy-in from the staff, and giving the staff some time to adapt to the change. Additionally, trying to integrate the new system with a system that is already in use to eliminate extra work, and being sensitive to people's experiences when introducing change. In addition, interns alluded to the importance of giving the staff prior notice to the change happening, and then training them to adapt to the change. This is supported by the following quotation:

“I think, training. Also maybe giving notice in advance, maybe two months in advance to say that there is going to be a change to the system, so people can prepare themselves. Just so that people are aware that they are going to be changing, so they have to do something different.” **(Intern 2)**

One of the interns emphasized the importance of knowing and understanding their obligation to provide patient care. The intern further alluded to frustration at the lack of improvement caused by the innovations introduced and suggested that management be willing to make changes to those improvements if they do not provide the expected outcome. This is supported by the following quotation:

“We have an obligation to deliver care, but we do not have an obligation to deliver the care quickly, unless it is an unstable patient, but that is a different story. Therefore, what we have to do is, we have to try and streamline the way we work, to try and make it as efficient as possible without compromising patient care. Many of these so-called improvements actually take twice as much time to perform, the same task and do not make a perceivable difference to the workload at the end of the day. Therefore, I think we need innovation, we need new ideas, we need systems, but we also need to be amenable to change those systems if they are not working.”

**(Intern 5)**

Likewise, one of the interns alluded to the importance of testing the feasibility of a new system before using it to replace a current system that works. The intern further suggested that during a change procedure, one element should remain constant, while the others change, to allow for those affected by the change to transition easier. This is supported by the following quotation:

“If you have a system that works, it’s better to keep the system that works, than change to a system that you are uncertain of. You have a high turnover of doctors that are coming in and out, that have to learn the system. So, if you have a system that is consistent, in that it is the same time all the time, it is going be easier for new people to come in and change. But now you are constantly having new systems and there are new people coming in - it’s a problem.” **(Intern 7)**.

The next section provides a summary of the findings.

## 4.5. Summary of Findings

Objective	Sub-objective	Ward Clerks	Medical Interns
<b>Gap Analysis</b>	Current Process; and Proposed Process	Clerks are not allowed to capture medical data on the proposed system due to legal regulations and their qualification level. Thus, the proposed process would exclude ward clerks. However their responses contribute to understanding their perceptions to change using an information system	Medical interns and pharmacy clerks would be the primary users of the proposed system. Medical interns possess the qualifications required to prescribe and capture medication requests. Pharmacy clerks would merely acknowledge receipt of the request and capture the time that the medication is ready for collection. The proposed process would reduce the time taken to receive medication by approximately 4 hours.
<b>Perception towards Change</b>	Willingness to Learn and Use New System	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.	All medical interns were willing to learn to use the new system. In spite of their willingness, some were concerned 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	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.	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	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.	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.
<b>Root-Cause Analysis</b>	Perceptions of Service Delivery	Most of the clerks believe 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	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	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.	All the interns agreed that the information system organizes patient information better, and minimizes record-loss. However, a few interns felt that using the information system was time consuming and a duplication of effort
	Perceptions of the Current Process	With the exception of 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.	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	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, communication, mutual respect, and involvement should be prioritized by management. 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.	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 successfully introduce change 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

Figure 15: Findings Summary

## Chapter 5: Analysis and Discussion

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This section presents a discussion on key findings that contribute to meeting the research objectives and purpose and thus answering the research question. However, this section will first present the analysis section with the coding results, before presenting the discussion section. The discussion section will be presented according to the objectives while highlighting themes that meet those objectives.

### 5.1. Analysis of the Findings

Firstly, data were collected through observations, combined with interviewing the head of the pharmacy and the patient flow manager at the hospital. This data was documented and used to map the current process flow. It also contributed to mapping the proposed process flow. Business process modelling notation (BPMN) was used when mapping the process flow, as it is a universally acknowledged process modelling language. Mapping the process was an iterative process, which entailed mapping, reviewing and correcting. The patient flow manager and the head of the pharmacy reviewed the process to ensure that it was a true representation of the current process. Although two proposed processes were mapped, the latter process, involving the Interns, was used for the gap analysis.

Secondly, data was collected through semi-structured interviews. Before commencing analysis, transcribed data was “cleaned” by rephrasing sentences without losing its meaning. Afterwards, the researcher ensured that the format was consistent across all the documents; “Heading 1” was used to format the questions, and “Normal” was used to format the answers. The Auto-code function on Nvivo was used to group the transcriptions according to questions. Thereafter, a preliminary analysis was conducted. The preliminary analysis involved running a query on Nvivo to see the word count based on synonyms. This was done to get a general overview of the data.

To analyze 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.

The next section presents the coding results.

### 5.1.2. Coding results

As mentioned in sub-section 3.3.6, this research used both inductive open and axial coding methods to code the transcriptions, before using sentiment and thematic analysis.

Open coding is seen by some authors, as the process of disaggregating data into concepts, labeling them, and grouping similar concepts by the given label (Saunders et al., 2008; Walsham, 2006). However, this study adopted open coding as described by Bhattacharjee (2012); open coding involves identifying key concepts within textual data, that relate to the phenomenon of interest, and naming them (Bhattacharjee, 2012).

For this study, open coding was conducted over four 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.

Figure 16 shows the number of codes identified in the first iteration, and subsequent groups formed.

Iteration One	128 open codes
Iteration Two	40 grouped codes
Iteration Three	27 grouped codes
Iteration Four	9 grouped codes

Figure 16: Open Coding Results

Figure 17 below shows the resultant codes from iteration 2.

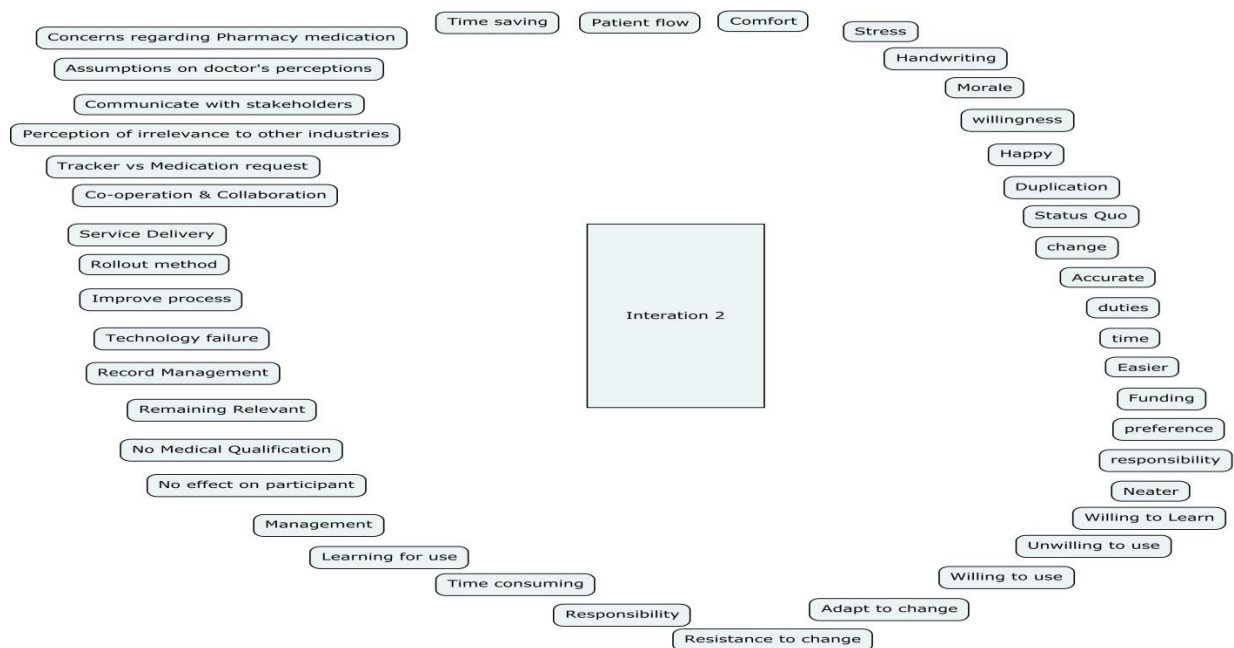


Figure 17: Enumerated Codes from Iteration 2

The sub-codes that form part of the resultant codes are omitted for simplicity. Figure 18 shows the resultant codes from iteration 3.

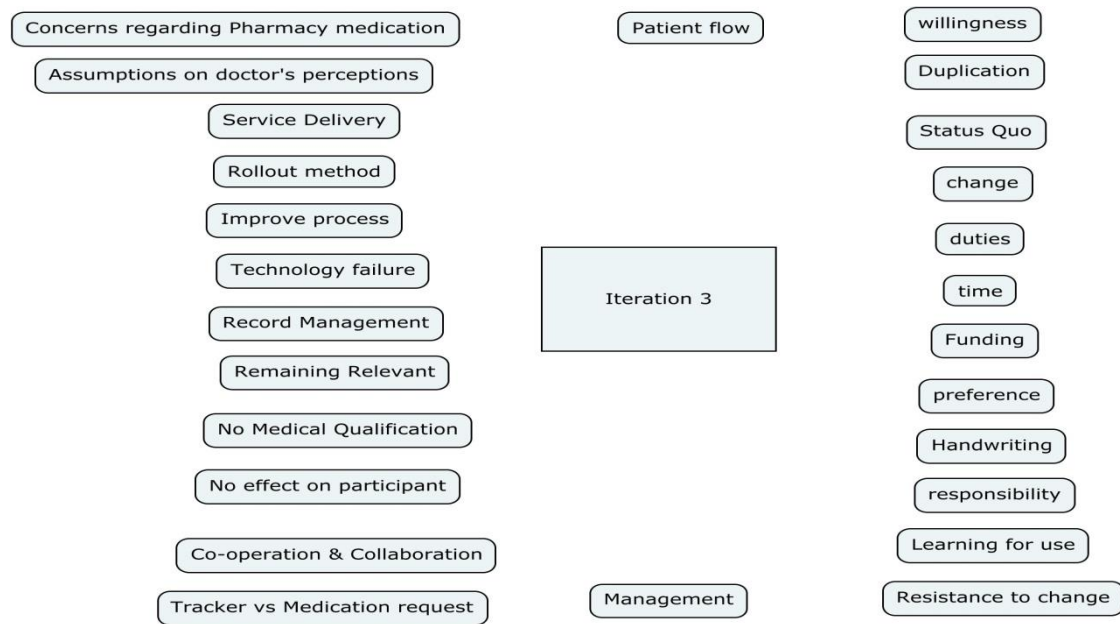
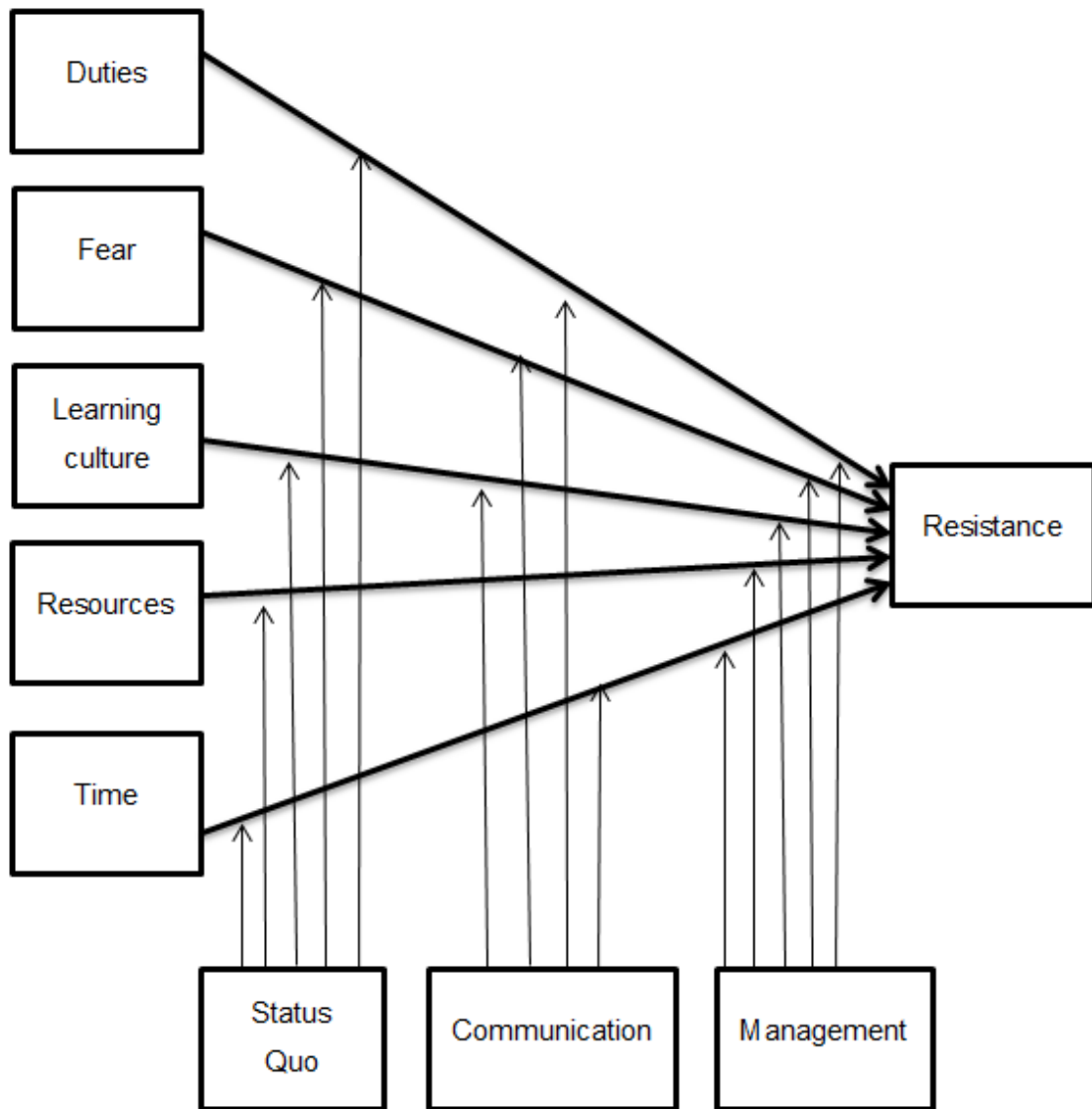


Figure 18: enumerates the codes from iteration 3

Axial coding is the process of forming causal relationships or hypotheses between grouped codes that emerged during open coding, which help to explain the researched phenomenon (Bhattacharjee, 2012; Saunders et al., 2008). These relationships may be evident in the data or subtle and implicit (Bhattacharjee, 2012).

After iteration four, the nine resultant codes were used for axial coding. Figure 19 shows the resultant codes arranged to depict a causal relationship, which is later used to explain the root cause for change resistance in sub-section 5.2.3, and as such is referred to as the Change Resistance Conceptual Model.



**Figure 19: 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). This conceptual model is further explained in sub-section 5.2.3, as part of the root-cause analysis.

## 5.2. Discussion

### 5.2.1. Objective One: Gap Analysis

A gap analysis “evaluates the difference between the organization’s current position and its desired future.” It often results in developing strategies and re-allocation of resources to close the gap (Infoway, 2013, p. 107).

Upon analysing the current process, it was found that, unlike the pharmacy, there are no explicit key performance measures set out for the interns and runners to work towards, regarding requesting and receiving medication. This has resulted in activities being done without a sense of urgency. In addition, the actual process is not carried out according to the stipulations in the Discharge Planning for Acute General Medicine document. For that reason, after observing and mapping the processes and examining literature, the following measures were identified as potential key performance indicators (KPIs):

- **Time**; the approximate time it takes to receive medication from the time T.T.O.’s and Blue Boards are collected by the runner (Hall et al., 2013)
- **Records missing**; the number of records that get lost on average (Mostert-Philips, Pottas, & Korpela, 2012). The number of records that have to be re-written measures this.
- **Patient satisfaction**; the level of patient happiness, determined by patient surveys that use a five-point Likert scale ranging from very happy to very unhappy (Harnett, Correll, Hurwitz, Bader, & Hepner, 2010). Patient satisfaction is impacted by the waiting time; the longer they wait, the unhappier they are (Dyck, 1996; Weimann & Stuttaford, 2014). This assumes the average acceptable waiting time is about 2 hours.
- **Informed Communication and Awareness**; the occurrence of communication between the pharmacy (clerks, and pharmacists), runners, and the ward (nurses and interns) (Cline & Luiz, 2013; Lenz & Reichert, 2007). This influences whether each actor knows the progress of the process.
- **Staff morale**; how happy the hospital’s staff are, determined by surveys that adopt a five-point Likert scale ranging from very happy to very unhappy (Cline & Luiz, 2013). Staff morale is impacted mostly by workload, patient satisfaction, and process congestions (Kimaro & Nhampossa, 2004; Rohleder et al., 2011; Silvestro, 2005).

Table 9 below highlights the main differences between the current and proposed process based on the KPI’s identified.

Key Performance Indicator	Current Process	Proposed Process Involving Interns
Time (Approximate measurement)	7 hours	3 hours
Records Missing	5	0
Patient Satisfaction	Very unhappy	Happy or Neutral
Informed Communication and Awareness	Irregular	Regular
Staff Morale	Very unhappy	Happy or Neutral

Figure 20: Gap Analysis Key Performance Indicators

The current process takes about seven hours from the time medication request forms (T.T.O.'s and Blue Boards) leave the ward, to the time the medication arrives at the ward. The reasons for this are unclear, as the head of the pharmacy said it takes about an hour and a half to process medication, from the point of receiving medication requests to the point of packaging medication for collection. Furthermore, this process time negatively influences patient satisfaction, as it results in longer patient waiting times to receive medication (Weimann & Stuttaford, 2014). Every so often, patients' relatives wait in the waiting area outside the ward, and pressure the nurses and ward clerks for the patient's medication. This pressure, coupled with uncertainty about when the medication would arrive or the progress of the process, lead to stressed and demoralized staff. This confirms studies that state that dissatisfied patients negatively influence staff morale (Kimaro & Nhampossa, 2004; Rohleder et al., 2011). On the other hand, patient records get lost during the transit between the ward and the pharmacy. This has a negative snowball effect; it affects patient waiting time, and staff morale, and results in the patient not receiving medication on the day, spending another night in the ward. This contributes to bed pressure due to the shortage of available hospital beds.

Conversely, given the pharmacy process time of an hour and a half, the proposed process could take about 3 hours. This is from the time the pharmacy clerk and pharmacists see and acknowledge receiving the medication requests on Microsoft Excel, to the time the medication is delivered to the ward. In addition to a thirty-minute buffer, it gives the runner an hour to collect the medication request forms and deliver the medication. In addition, since the medication request will be sent first electronically, the pharmacy clerks and pharmacists would be able to begin with processing the medication. This is so that when the runner delivers the physical medication request forms, the clerks would only need to cross check that the medication requested on Microsoft Excel corresponds with what is written in the forms. In the same vein, one of the interview respondents mentioned that pharmacists were not permitted to dispense medication without a medication request form that had been signed by a registered doctor. This is supported by the following quotation:

“It is a release protocol; you can’t just get any medication without a signed T.T.O.”

**(Intern 7)**

In view of that, new medicine regulations are needed, in order to cater for electronic medicine requests. This new medicine regulation would also be of benefit when it comes to records getting lost. The pharmacy would still be able to dispense medication without needing to crosscheck the electronic record with the physical record before giving the runner medicine for the ward. Nevertheless, after crosschecking the medication requests on Microsoft Excel with the request forms, the pharmacy clerks would package the medication and give it to the runner to deliver it to the ward. At the ward, the normal procedure would follow; the runner would give the medication to the ward nurse, who then gives it to the relevant patients. This would result in a faster process and ultimately, satisfied patients.

There is a link between patient satisfaction, staff morale, and patient expectations (Rohleder et al., 2011; Silvestro, 2005). In an attempt to curb patient dissatisfaction and thus improve staff morale, patient expectations should be managed. One way to do that is by giving patients a realistic, yet overestimated waiting time, to allow for any delays that may arise. By doing so, an opportunity to meet or even exceeded patient expectations is created (Atinga, Abekah-Nkrumah, & Domfeh, 2011). This, as “delays perceived by patients as petty and unreasonable could escalate into anger and dissatisfaction” (Atinga et al., 2011, p. 553).

Similarly, the proposed process facilitates transparency; more informed communication and increased awareness during the process. This is because using the information system during the process enables all those involved in the process to know the progress of the process at any given time; when the medication is requested, when the medication request is acknowledged, and when it is ready for collection. Furthermore, when sharing a document on Microsoft Excel, users are able to communicate with each other by using the comment function.

### **5.2.2. Objective Two: Perceptions towards Change**

In view of the various perceptions towards change documented in section 4.3, the perceptions that were common to medical interns and clerks are discussed below.

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

allude 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 to use 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 of 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 (Bhattacharjee &

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.

### **5.2.3. Objective Three: 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 conceptual model in Figure 17.

The Change Resistance conceptual model is used 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 Bhattacharjee (2012), an independent variable is used to explain another variable, while a dependent variable is explained by other variables. A moderating variable "influences the relationship between the independent and dependent" variables (Bhattacharjee, 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.

This sub-section discusses each independent and moderating variable with its sub-constructs, while highlighting the relationships between the independent and moderating variables that could influence change resistance. It begins with the moderating variables, before describing the independent variables and possible relationships.

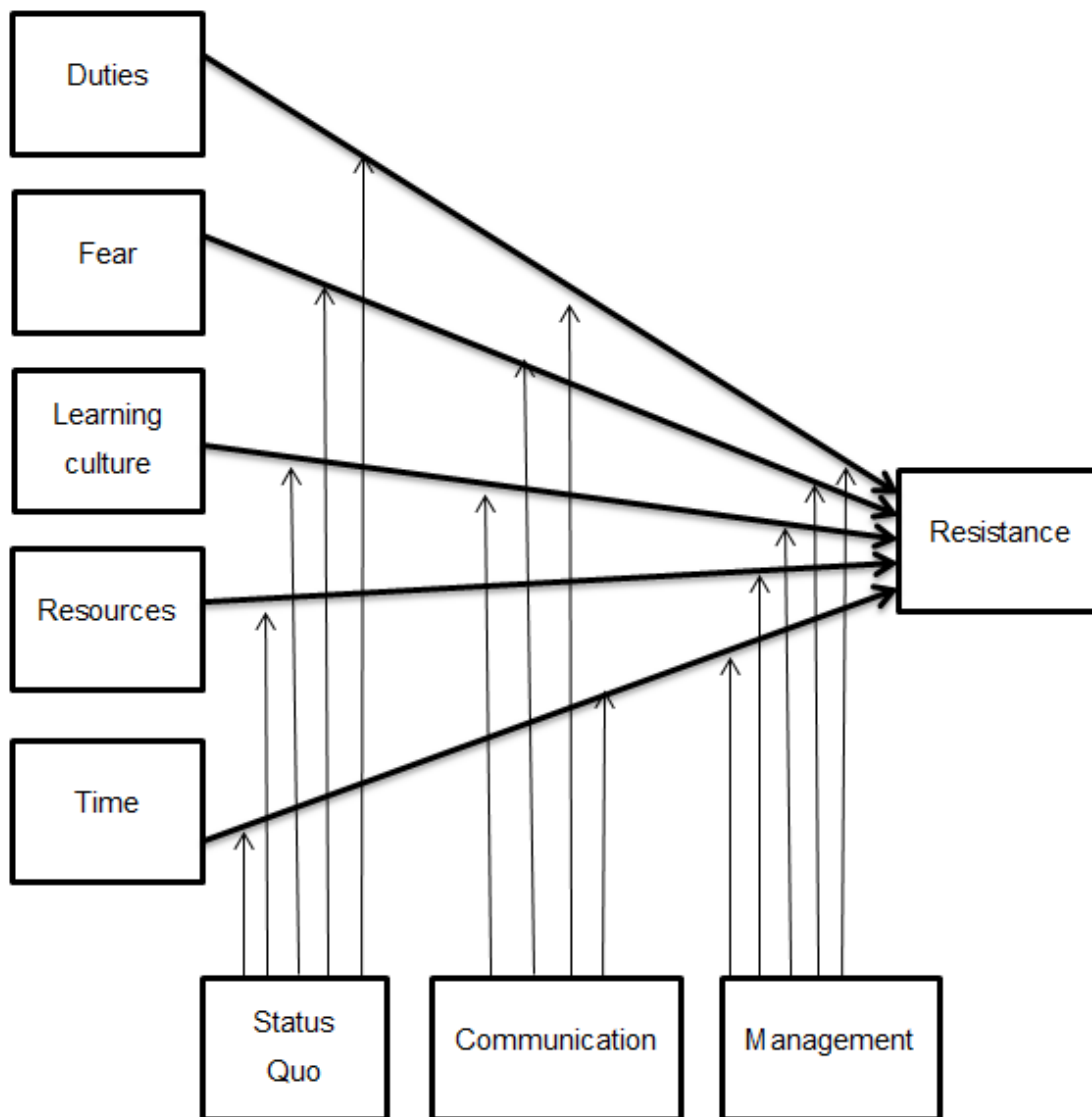


Figure 21: The Change Resistance Conceptual Model

**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; Bhattacharjee & 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 make 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 (Lunenborg, 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.

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 (Bhattacharjee & 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 refers 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 (Bhattacharjee & 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).

The next section provides the study's conclusions.

## Chapter 6: Conclusions and Recommendations

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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 patient dissatisfaction related to current public hospital processes (Adam et al., 2012; Kimaro & Nhampossa, 2004; Kinfu, 2013; Weimann & Stuttaford, 2014). Some studies indicated that introducing information systems into hospital processes often resulted 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.

From the Gap Analysis, the main findings are that there are no key performance indicators (KPI's) set out for the ward staff (the interns and runners) to work towards. Possible KPI's are time; number of records missing; patient satisfaction; informed communication and awareness; and staff morale. In addition, the main differences between the current process

and the proposed process are the approximate process time (from 7 hours to 3 hours), the average number of records missing (from 5 to 0), patient satisfaction (from unhappy to happy or neutral), informed communication and awareness (irregular to regular), and staff morale ( from very unhappy to happy or neutral).

Regarding the participants' perceptions towards change, some of the main findings are that there was a general willingness to learn to use 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 in order 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. What is more, 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.

## Chapter 7: References

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# Appendices

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## Appendix A: Western Cape Department of Health Consent



### GROOTE SCHUUR HOSPITAL

Enquiries: Dr Bernadette Eick  
E-mail : [Bernadette.Eick@westerncape.gov.za](mailto:Bernadette.Eick@westerncape.gov.za)

Professor Peter Weimann  
Faculty of Commerce  
UCT Upper Campus

E-mail: [jp@oriston@gmail.com](mailto:jp@oriston@gmail.com)

Dear Professor Weimann

**RESEARCH PROJECT: Analysis of change resistance to an Information Systems supported business process in a South African hospital (Masters Candidate – M Fok)**

Your recent letter to the hospital refers.

You are hereby granted permission to proceed with your research and is valid until 30<sup>th</sup> March 2017.

Please note the following:

- a) Your research may not interfere with normal patient care.
- b) Hospital staff may not be asked to assist with the research.
- c) No additional costs to the hospital should be incurred i.e. Lab, consumables or stationary may be used.
- d) **No patient folders may be removed from the premises or be inaccessible.**
- e) Please introduce yourself to the person in charge of an area before commencing.
- f) Please discuss the study with the HOD before commencing.
- g) Please provide the research assistant/field worker with a copy of this letter as verification of approval.
- h) Confidentiality must be maintained at all times.
- i) Should you require additional research time beyond the stipulated expiry date, please apply for an extension
- j) **Once research is complete, please submit a copy of the publication or report.**

I would like to wish you every success with the project.

Yours sincerely

signature removed to avoid exposure online

**DR BERNADETTE EICK**  
CHIEF OPERATIONAL OFFICER  
Date: 25<sup>th</sup> May 2016  
BE/vms

C.C. Mr L. Naidoo  
Professor E. Weimann

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## Appendix B: University of Cape Town Faculty of Health Science Ethics Approval



**UNIVERSITY OF CAPE TOWN**  
**Faculty of Health Sciences**  
**Human Research Ethics Committee**



**Room E52-24 Old Main Building**  
**Groote Schuur Hospital**  
**Observatory 7925**  
**Telephone [021] 406 6338 • Facsimile [021] 406 6411**  
**Email: [sumayah.ardefdien@uct.ac.za](mailto:sumayah.ardefdien@uct.ac.za)**  
**Website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms)**

30 March 2016

**HREC REF: 181/2016**

**Prof P Weimann**  
Department of Information Systems  
Faculty of Commerce  
UCT

Dear Prof Weimann

**PROJECT TITLE: ANALYSIS OF CHANGE RESISTANCE TO AN INFORMATION SYSTEMS SUPPORTED BUSINESS PROCESS IN A SOUTH AFRICAN HOSPITAL (Masters candidate- M Foli)**

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

**Approval is granted for one year until the 30<sup>th</sup> March 2017.**

We acknowledge that the following Master of Commerce student, Matilda Foli, will also be involved in this study.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms))

**Please quote the HREC REF in all your correspondence.**

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Yours sincerely      signature removed to avoid exposure online

**PROFESSOR M BLOCKMAN**  
**CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE**

Federal Wide Assurance Number: FWA00001637.

Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH

Hrec-ref181/2016

## Appendix C: Participant Consent Form

### Informed Consent form

Dear Sir/Madam,

#### **Why is this study being done?**

I am completing a Masters of Commerce Degree in Information Systems at the University of Cape Town, and am required to complete a research study. Under the supervision of Professor Peter Weimann and Dr. Professor Edda Weimann, I have chosen to conduct a case study entitled "An Analysis of Change Resistance to an Information Systems-supported Business Process in a South African Hospital". As part of the study, we intend on introducing a computer program that will be used to capture and store data. I will also provide training to use the program. After that, I would like to observe your reactions to using the system, and then interview you to find out your views about using the system as opposed to using the current paper system.

#### **Why are you being asked to take part?**

You have been identified as an important person who is part of the process that may involve the new computer program, and have consequently been chosen to take part in the research study.

#### **How many people will take part in the study?**

The nature of this study requires that interviews and observations be done. Due to time constraints, a maximum of 15 people will be asked to take part in the study.

#### **How long will the study last?**

The whole study will last approximately six months. Training to use the new computer program will be a total of 3 hours (an hour a day). Observations and interviews will be conducted weekly. Each interview is meant to last for an hour.

#### **What do we do to decide if you are eligible to take part?**

After deciding on the processes that will be under review during the study, we looked for key people involved in the process. This was done based on the roles they played and the jobs they did during the processes.

#### **What will happen if you decide to take part in the study?**

If you decide to take part in the study:

- You first need to sign this form, which will indicate that :
  - You have read and understand everything written in this form.
  - You give us permission to interview you and use what you have said as part of our data for the research.
  - You give us permission to observe your interaction with the system and record our observations.
  - You give us permission to record the interview using a voice recorder.
- Provide us with a contact number or email address.
- Indicate possible days and times that would best suit you to be interviewed.
- When a suitable day and time is agreed upon, you would need to arrive at the venue.
- Once at the venue, you will be asked to answer questions about your gender, age, about whether you've used a computer before, about your current work, about past work experience, and about job training.
- Answer interview questions about your view of current hospital information systems, your views about service delivery, your views about electronic health records, your willingness to use a new computer/ information system, and reasons why change has not happened .

The interviews and observations will be conducted at Groote Schuur Hospital. All information will be treated in a confidential manner and used exclusively for the purpose of this study. Your name will not be recorded or published. You will not be requested to supply any identifiable information, ensuring anonymity of your responses.

#### **What are the risks and discomforts of this study?**

There are no risks involved in participating; however, you may feel uncomfortable answering some of the interview questions. Nevertheless, the interview questions are impersonal and refer mostly to your view of using the new computer program. Also, the responses you give cannot be traced back to you, as no identifiable information will be used.

#### **Are there any benefits to you for being in the study?**

Yes, there are benefits to participating in the study. Firstly, by participating in the study, you gain knowledge on how to use this computer program. This knowledge can be applied in any administration position, and is not limited to hospitals. Lastly, if the study produces a positive result, and the information system is adopted, it could help decrease your workload, and save you time during the process.

**What happens if you do not want to take part in this research?**

If you do not want to take part in this research, nothing bad will happen. Your participation in this research is voluntary. You can choose to withdraw from the research at any time for whatever reason, in accordance with ethical research requirements.

**What will happen when the study is over?**

When the study is over, regardless of the outcome of the study, a thesis will be published. Depending on the outcome of the study, the hospital management may refer to the study's results to make a decision, if they decide to make changes to the current record capturing and storing process.

**Will the results of the research be shared with you?**

The results of the research will not be directly shared with you. Instead, after the reviewing process, they will be made publicly available for anyone who is interested to access and read them.

**Will you receive any reward (money or food vouchers) for taking part in this study?**

No, you will not receive any reward for taking part in this study.

**Who will see the information which is collected about you during the study?**

The information collected during the study will only be available to myself (the student), and my supervisors to see. This is to ensure that the information is kept confidential. While writing up the research results, care will be taken to ensure that no one will know it was you who was interviewed.

**Who do I speak to (or contact) if I have any questions about the study?**

The UCT's Faculty of Health Sciences Human Research Ethics Committee can be contacted on 021 406 6338 in case you have any ethical concerns or questions about your rights or welfare as a participant on this research study. Additionally, should you have any questions regarding this research, please feel free to contact me or my supervisors via email: [Matilda.Foli@alumni.uct.ac.za](mailto:Matilda.Foli@alumni.uct.ac.za) , [peter.weimann@uct.ac.za](mailto:peter.weimann@uct.ac.za) , [edda.weimann@uct.ac.za](mailto:edda.weimann@uct.ac.za) , respectively.

Your participation in this study would be greatly appreciated, but is entirely voluntary.

Sincerely,

### **Research Participant Consent Form**

I, \_\_\_\_\_, (*Name and Surname*) consent to participate in the research on An Analysis of Change Resistance to an IS supported business process in a South African Hospital

I have read and understand everything outlined in the consent form, and agree to it.

I am aware that participation is voluntary and that I may choose to withdraw from this study at any time, should I choose to do so.

\_\_\_\_\_

Signature

Date

## Appendix D: Research Instrument Profiling Section

Please tick the one that applies

Gender: M / F

Age: 20-30

31 – 40

41 - 50

51- 60

61 – 70

Have you used a computer before: Yes / No

Have you been trained to use a computer? Yes / No

Do you use a computer regularly at work? Yes / No

Please answer the following questions

Which applications (Microsoft Excel, Microsoft Word etc) are you familiar with?

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What is your job title?

---

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How long have you been working at Groote Schuur Hospital?

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Did you receive training for the job you are currently employed in? Please describe the training

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Have you worked anywhere else before working at Groote Schuur Hospital? If yes, where did you work?

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If you answered yes to the previous question, which sector did you work in?

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## Appendix E: Research Instrument Interview Instrument Questions

### **Willingness to adopt new system**

1. How do you feel about learning to use new information system ?
2. What were your initial views about having to use the information system?
3. What result do you think the information system has on staff morale in the workplace?
4. How do you feel about using an information system instead of a paper ?
5. If you did not use the information system, what effect would it have on you?

### **Perceptions of Hospital Information Systems**

6. How do you find working with the information system rather than the paper system?
7. Between the information system and the paper system, which would you rather use? Why ?
8. How do you feel about moving to a paperless system?

### **Electronic Health Records Perceptions**

9. What do you think about the time spent entering information, as well as on duplication of information?
10. Between the information system and the paper system, which system do you think organizes patient information better?
11. How does the information system affect record management, and the number of records that get lost?

### **Perceptions of Service Delivery**

12. How happy are you with the current way processes are done?
13. Is there a difference in the service delivery when using the paper system and when using the information system? please explain
14. Why do you think change has not taken place at the hospital?
15. What do you think can be done to successfully introduce change