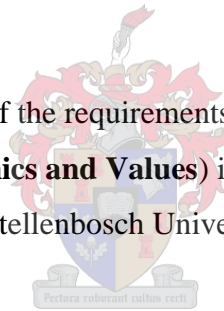


**BUSINESS PROCESS INTEGRITY & ENTERPRISE
RESOURCE PLANNING SYSTEMS:**

**An Analysis of Workaround Practices in a Large Public Sector
Organisation**

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Thesis presented in partial fulfilment of the requirements for the degree of Master of Philosophy
(**Decision Making, Knowledge Dynamics and Values**) in the Faculty of Arts and Social Sciences
at Stellenbosch University



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DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously, in its entirety or in part, submitted this thesis for obtaining any qualification.

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ABSTRACT

Information Technology (IT) artefacts, such as Enterprise Resource Planning systems (ERPs), promise much with regard to meeting the requirements of organisations. In the knowledge economy, organisations require real time data, information flow and integration of business processes to remain financially viable and competitive. However, organisations often fail to harness ERP systems effectively. This thesis attempts to unpack a section of the complex nature of ERPs with emphasis on the post-adoption phase of the systems' development life cycle. This study explores the complex interface between rigid IT artefacts like ERPs and the, often unpredictable, reality of organisational work processes. Focus falls, in particular, on the workaround practices that end users of the system perform and the effects these have on the integrity of the business process.

Based on an extensive literature review, an integrated framework for business process integrity is developed and formulated. This model is applied to the analysis of a qualitative data set compiled during an empirical investigation of a large Local Government Organisation utilising a proprietary ERP product. The data set includes semi-structured interviews with members of the ERP user community relating to their handling of impositions or deficiencies experienced when using the artefact.

To define the relationship between business process integrity and workaround practices, each workaround identified is individually analysed to determine the reasons and outcomes that are associated with its enactment. Results indicate that workaround practices have diverse impacts on the various dimensions of business process integrity. While, in certain scenarios, they pose serious threats to organisational performance, they also play a particularly important role in enhancing the organisation's ability to handle non-standard business cases. Despite their informal and often covert nature, workaround practices are at the heart of the balance between control and flexibility in organisations and their existence suggests that, contrary to common beliefs, ERPs only have limited agency in determining organisational workflow.

OPSOMMING

Inligtingstechnologie (IT) artefakte, soos ondernemingshulpbronbeplanningstelses (OHBs), beloof baie ten einde aan organisasies se vereistes te voldoen. In die kennis-ekonomie vereis organisasies regstreekse data, inligtingsvloei en integrasie van besigheidprosesse om finansiële lewensvatbaar en kompetender te bly. Dikwels faal organisasies egter om OHB stelsels effektief te benut. Hierdie tesis poog om 'n deel van die ingewikkelde aard van OHBs te ontleed, met klem op die post-aanvaardingsfase in die stelsels se lewensiklus. Hierdie studie ondersoek die ingewikkelde koppelvlak tussen rigiede IT artefakte soos OHBs en die dikwels onvoorspelbare realiteit van organisatoriese werk prosesse. Die klem val in besonder op die alternatiewe praktyke wat eindgebruikers van die stelsel gebruik, en die uitwerking wat hierdie praktyke op die integriteit van die besigheidsproses het.

Gegronde op 'n uitgebreide literatuurstudie, is 'n geïntegreerde raamwerk vir besigheidsprosesintegriteit ontwikkel en geformuleer. Hierdie model is toegepas op die ontleding van 'n kwalitatiewe datastel wat saamgestel is tydens 'n empiriese ondersoek van 'n Plaaslike Regeringsorganisasie wat 'n privaat patent OHB-produk gebruik. Die datastel sluit semi-gestruktureerde onderhoude in wat met lede van die OHB gebruikersgemeenskap gevoer is met betrekking tot hul hantering van opleggings of tekortkominge wat tydens die gebruik van die artefakte ondervind word.

Om die verhouding tussen besigheidsprosesintegriteit en die toepassing van omweë te definieer, is elke geïdentifiseerde alternatiewe individueel ontleed om sodoende die redes en uitkomstes wat met die uitvoer daarvan geassosieer word, te bepaal. Resultate dui aan dat alternatiewe gebruike diverse uitwerkings op die verskillende dimensies van besigheidsprosesintegriteit het. Terwyl, in sommige gevalle, dit ernstige bedreigings vir organisatoriese prestasie inhou, speel dit ook 'n besonder belangrike rol in die verbetering van die organisasie se nie-standaard bedryfsake. Ten spyte van hul informele en dikwels verborge aard, is alternatiewe gebruike die hart van die balans tussen beheer en buigzaamheid in organisasies, en hul bestaan dui daarop dat, in teendeel met algemene oortuigings, OHBs net beperkte werking het met betrekking tot die bepaling van organisatoriese werksvloei.

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GLOSSARY

AGSA	- Auditor General of South Africa
BP	- Business Process
BPI	- Business Process Integrity
BPM	- Business Process Management
BPO	- Business Process Outcome
BPW	- Business Process Workaround
BS	- Bypass System
CR	- Changing Roles
DM	- Data Manipulation
ERP	- Enterprise Resource Planning
ECI	- Efficiency
EP	- Emergency Processes
ES	- External Systems
ETI	- Effectiveness
FXI	- Flexibility
IS	- Information Systems
IT	- Information Technology
ISRG	- Information Systems Research Group
IST	- Information Systems & Technology
LGO	- Local Government Organisation
ME	- Mediation

MRP	- Manufacturing Resource Planning
PAD	- Policy Adherence
SCM	- Supply Chain Management
TRC	- Traceability
UML	- Unified Modelling Language
VS	- Verbal Signature
WA	- Workaround

CHAPTER 1

INTRODUCTION

1.1 Background

Large Information System (IS) artefacts have become standard components of organisations in today's complex and changing business environment. Organisations operating in the knowledge economy rely on the integration of their information processing requirements into a single, scalable IS to remain financially viable and competitive. It has become essential that organisations, both private and public, endure the necessary means to handle the new dimensions of the knowledge age and ensure their survival in such complex and competitive environments (Friedman, 2006).

With the emergence of the knowledge economy, organisations have been forced to introduce ISs that will allow them to merge data, information flow and business processes into a single package. In many cases these types of ISs have been present in organisations for long periods; however, due to the complexities faced and the integration and functioning required, they were not able to produce the operational efficiency and effectiveness required. This ultimately culminated in the advent of large scale Information Technology (IT) artefacts that are centred on integration across functional departments and task models while ensuring information flow and integrated business processes (Kallinikos, 2004; Lengnick-Hall *et al.*, 2004). At the heart of these developments lie Enterprise Resource Planning Systems (ERPs).

ERPs differ from traditional (or legacy) systems in terms of their scale, complexity and potential for triggering organisational change. They have a profound impact on organisational processes, flow and transparency. Developed in the context of manufacturing, ERPs were originally designed for inventory control and typically subscribe to the idea of an organisation operating as a machine. This mechanical view of process and structure seeks to identify structured flows in the organisation to reach the desired goal of defined business processes. Not surprising, the rising popularity of ERPs attracted the attention of researchers from various fields of study (Umble *et al.*, 2003; Morgan, 2006; Morton & Hu, 2008; Ignatiadis & Nandhakumar, 2009).

1.2 Motivation for Research Study

ERPs potentially offer major benefit to organisations due to their integration and information processing capabilities, with some even stating that they are an organisation's "dream come true" (Umbel *et al.*, 2003:243). However, a significant number of organisations reported that they fail to realise the expected benefits these systems offer (Umble *et al.*, 2003; Ignatiadis & Nandhakumar, 2009). Various pundits contribute such failure to implementation concerns relating to selection and adoption strategies (Stefanou, 2000; Nah *et al.*, 2001; Bernroider & Kock, 2001; Verville *et al.*, 2005; Wei *et al.*, 2005). Research in the field has, therefore, focussed on this area of ERP projects with academics conducting both empirical and theoretical studies. With rapid growth in both ERPs and the literature about it, research begun to spread to a wider spectrum of problems relating to the functioning of ERPs. Among these are selection and adoption strategies for ISs focusing on specific issues and problems related to these techniques. There are, however, "only a few studies investigating issues relating to the post implementation of ERP systems" (Ignatiadis & Nandhakumar, 2009:60).

In the research done on ERPs post-adoption, failure is typically attributed to the misalignment between the artefact and the organisation (Sia & Soh, 2007; Yen *et al.*, 2011), and the structural effects of adoption on the organisation (Sia *et al.*, 2002; Ignatiadis & Nandhakumar, 2009; Zhu *et al.*, 2010). Building on this line of work, this study will address the post-adoption phase of ERPs with special focus on the social dynamics that define the structure of both the organisation and the IS.

1.3 Research Problem

The identified lack of research in the field of ERPs' post-adoption and the broader IS field enables the researcher to further delimit the research problem. The post-adoption phenomenon of ERPs resonates with a structure of control and rigidity. The artefact is embedded in the processes of the organisation and enables integration of information across the organisation. If implemented successfully, the ERP artefact is engrained in the structure of the organisation, with the end users following system prompts during task completion.

ERPs, through their integrated and rigid structures, impose a culture of discipline and conformity on the adopting organisation. The use cases built into the system enforce control of business processes, ensuring machine-like organisational operation. However, some scholars have shown that

individuals are free to enact technology in different ways, often creating improvised ways of processing that can produce novel and unanticipated consequences (Boudreau & Robey, 2005). Individuals may, for example, enact non-compliant user behaviour that is contrary to the intended workflow. Such behaviour is typically adopted when “a mismatch occurs between expectations of technology and actual working practices, employees may implement a ‘workaround’ by deviating from set procedures” or defined business processes (Ferneley & Sobrepez, 2006:346).

Workaround practices form the primary focus of the proposed research problem. These post-implementation phenomena have been identified in literature, but the field’s understanding of their internal workings remains limited. Nonetheless, it is broadly acknowledged that they are common practice in organisations that adopt ERPs. There is, however, no research that specifically addresses the relationship between workarounds and business processes. Furthermore, workaround practices themselves remain largely under-researched. As a result, this post-adoptive behaviour of workarounds in organisations that adopted an ERP is an area in the field of IS that requires further research and analysis. This study aims to address this gap in the field.

1.4 Research Question and Hypotheses

The research problem outlined above addresses a specific issue identified in the context of ERPs and their effects on organisations. Due to the rigid control that the system enforces on the organisation, scenarios occur in which there is a misalignment between the system and organisation. These are likely to trigger workaround practices. To investigate these phenomena systematically, the following primary research question is proposed:

What is the relationship between business process integrity and workaround practices?

The aim of exploring the relationship between the two phenomena identified is to understand how users enact the system when faced with problems caused by the rigid control and structure of an ERP. User enactment, once analysed, enables the identification of the effects that workarounds have on Business Process Integrity (BPI). The concept of BPI can be defined and formalised by using existing literature for the purpose of the analysis.

From the main research question, three secondary research questions can be put forward. These questions are posed as follows:

- a) what constitutes business process integrity in organisations adopting propriety ERP products?;
- b) what factors influence the enactment of end users of an IT artefact?; and
- c) what are the prominent types of workaround categories post-adoption?

The three sub-questions posed above are directly formulated from the primary research question posed. The first sub-question is proposed to develop an understanding of what constitutes integrity in a business process. This is an area that is under-researched in the field of IS and requires specific attention to answer the primary research question. The second sub-question aims to develop an understanding of the influences on user enactment. This is a central question with regards to users' enactment of the system as it is largely defined by the social dynamics developed/developing in the organisation. The final sub-question aims to add to the knowledge base of workaround practices that have been identified in the literature. They are categorised according to user behaviour and the specific workaround practice performed.

In conjunction with the primary research question, the following two hypotheses were developed:

- 1) workaround practices that end users of ERPs enact pose a *threat* to business process integrity in organisations; and
- 2) workaround practices that end users of ERPs enact serve as a *safeguard* for business process integrity in organisations.

The first hypothesis supports the notion that workarounds pose a threat to the integrity of the business process due to the nature of user enactment. Underlying this hypothesis is the notion that the ERP has the required functionality and structures to enable the completion of a business process and workarounds hinder BPI. They are therefore defined as a threat to the organisation and can be argued to pose a risk to the integrity of the process and the organisational goals.

The second hypothesis, however, states that workarounds are necessary parts of an organisation's business process. They are not a threat but rather a safeguard of the business process; without them the system would be unable to uphold the integrity of the business process. They provide the process with the necessary robustness to complete a process that is in line with the goals of the organisation.

The two hypotheses propose two distinct outcomes with reference to the primary research question. Based on face value the two hypotheses appear to be the inverse of each other and could be argued to be simply one hypothesis or null hypotheses. However, this is not the case due to the complexity of the research question posed in relation to workaround practices and the relationship with business process integrity.

In many instances a workaround practice executed by the end user of an IS has multiple dynamics that make up the complex phenomenon and thus could have multiple repercussions depending on the type of workaround performed. In other words, a workaround performed can have a positive influence on the integrity of the business process and thus prove to be a safeguard to the organisation on a meta-level (as opposed to a threat). However, in-depth analysis of the workaround can often prove that specific aspects or specific dimensions pose a genuine threat to the business process. A workaround can therefore produce both positive and negative outcomes to the integrity of the business process. These need to be recognised as such before evaluating the final outcome.

Workaround practices are complicated further due to the nature of their enactment. Workarounds often involve multiple users to execute the workaround and the resultant effects are often contrasting at different points in the business process. A user can adopt a workaround practice to solve a problem in the business process (and thus proving a safeguard) for example. However, it can result in a major threat further down the business process line. In the majority of instances, workarounds are performed to produce a positive (or safeguard) outcome by the user, instead this can lead to negative outcomes and thus pose a risk to BPI.

The two hypotheses developed in relation to the primary research question are designed to answer specific dimensions within BPI due to the complex nature of the research being conducted. The overall resultant maybe a safe-guard to the integrity of the business process (or vice-versa), however, the specific instances of threats or risks that could result need to be noted. It is for this reason that the two hypotheses were designed as presented above.

1.5 Research Design

The research design involves two clearly defined sections. The first is a review of the existing literature in the field. During this phase the researcher analysed a large collection of literature relating to ERPs, with particular focus on their impact on business processes. Based on this analysis

the researcher will develop an integrated framework for BPI in the context of ERP utilisation. The formalisation of a BPI framework concludes the first section of the research.

The second section of the research design involves an empirical investigation. The investigation utilises a data set compiled during an extensive case study performed at a large Local Government Organisation (LGO) using a proprietary ERP product. Based on the data set, a variety of workarounds are identified and analysed. The data analysis involves the use of coding techniques which, by means of the BPI framework, enables the identification of the relationship between BPI and workaround practices. The findings are presented in matrix format.

1.6 Significance of Research to the Field

The field of IS requires further attention to post-implementation workaround practices and the resulting soft issues identified; this research aims to address that need. It is significant, as it produces novel insight into workarounds that develop in a large organisation that adopted a proprietary ERP solution.

The relationship analysed between business process integrity and workaround practices determines specific areas of concern that have not been addressed by research in the field. The post-implementation effects of ERPs are fragmented in terms of research conducted and are largely viewed as an under-researched issue. Therefore the findings presented above deepen the knowledge base on workaround practices and enable future academics to gain an understanding of the relationship between the two phenomena.

The value of the results is seen as two-fold. Firstly, academics in the field of IS can apply the results to the context of their own research. Understanding the effects of workarounds on business processes can prove to be a key element of success or failure for an organisation. By furthering the knowledge base, academics are able to develop a clearer understanding of how users enact technology and how to identify soft issues of concern. Secondly, the research has practical significance. An increased understanding of workaround practices enables both the organisation under investigation and other organisations in a similar environment to increase the integrity of their business processes. Business processes can be improved by understanding the complex social phenomena prevalent in organisations that adopt integrated IT artefacts.

Topic is relevant to not only public sector in question but the private sector as there is a belief that workaround has negative organisational connotations. This research reiterates that assumption as

well as making a case for the positive influence of workarounds on the integrity of the business process. By researching an under-researched issue in the field of IS, it is possible to illuminate certain socio-technical aspects of IS that lead to both integrity of business process and the achievement of organisational goals.

1.7 Layout of Chapters

The thesis aims to further knowledge of workaround practices performed in large organisations that adopt ERPs. The research question and hypotheses posed in accordance with the research problem identified in this chapter introduce the defined area of study. The study comprises a total of five chapters that constitute the structure and layout of this thesis, of which this is chapter 1.

Chapter 2 reports the findings of the literature review and constitutes the first of the two major sections that form the thesis. The chapter identifies the main authors in the field and their theories about business processes in the context of ERPs. This is followed by a literature review of ERPs, with particular focus on post-adoption phases. The second section reviews literature on business processes and business process management. An integrated theoretical framework is also introduced. The limited research into workaround practices is then identified and discussed in terms of the research study being conducted. The BPI framework developed in this section is used in the empirical investigation.

The next section of this thesis comprises two chapters. Chapter 3 reports the empirical investigation conducted, which takes the form of a qualitative case study. The chapter provides background of the organisation investigated before introducing the data collection methods adopted. The final section outlines the analysis of the collected data. The findings of the investigation are reported in chapter 4. The chapter categorises the workarounds identified in the empirical investigation. Examples are provided for each category, with certain workaround practices identified in accordance with the literature, and new categories introduced. The next section in the chapter unpacks the relationship of each category in terms of the BPI framework developed in chapter 2.

Chapter 5 provides a summary of the findings followed by the limitations, implications and possible avenues of future research in this area.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In order to investigate the relationship between business process integrity and IS workaround practices, an extensive review of existing literature in relation to the research question needs to be conducted. Workarounds in particular is a relatively new and under-researched topic in the field of IS and its relation to business process integrity, although briefly and indirectly touched on, has not been explicitly investigated. The chapter will therefore provide an overview of the literature presented in the context of the study. The review is divided into three sections to provide a theoretical understanding of the existing research in the field of IS. As a result, a gap in the research is identified and positioned in the context of the research question posed in the previous chapter. The chapter will also introduce the integrated framework adopted from the literature identified to conduct the research study. Consequently, the applied framework is the first component of the research design to be introduced.

The chapter consists of five sections. Following the introduction, a review of the literature on ERPs is provided to explore the role of an IT artefact in organisations. The section introduces the reader to the concept of ERPs and addresses the post-adoption literature in the field. The section introduces the context of the study. The key concept of a business process is introduced to the reader during the explanation of ERPs and comprises section 3 of the review. Following a definition, the field of business process management is introduced and the role of business process outcomes presented. This introduces the key characteristics of a business process with ERPs. The framework developed is introduced following this review. It incorporates the existing research identified and applies the rational distinguished to create a model that constitutes integrity in an ERP business process.

Section 4 reviews literature on workaround practices in ERPs. The research into the “fallacy of best practice” and mechanical processing of the artefact is identified. Following this, an argument is developed for the occurrence of issues/problems (referred to as misfits or misalignments) that develop. The defined literature on workaround practices is then presented. Following a definition, research is explored on the execution of workaround practices in organisations. Instances of

workarounds are identified and positioned in the context of the study. The fifth and final section of the review provides a conclusion to the gap in the literature identified.

2.2 Enterprise Resource Planning Systems in Large Organisations

As defined by Castells (2000), we shifted into a new societal paradigm at the end of the 20th century. The shift is towards a culture and society organised around Information Technologies. It is characterised by information and data that are continuously changing and flowing in this ever-changing environment. With the growth of globalisation and the rapid development of information technologies, organisations are increasingly adapting operations to deal with the complexities faced. Real-time information is no longer a competitive advantage, but a necessity. Organisations now require integration and flow of information in functional departments to keep pace with the complex and changing business environments. As Friedman (2006) explains, the world is increasingly becoming flat and organisations need to respond to this shift.

The current technological revolution is not characterised simply by the importance of knowledge and information, “but the application of such knowledge and information to knowledge generation and information processing/communication devices” (Castells, 2000:32). The shift towards information processing, coupled with globalisation, resulted in the development of large scale ISs to manage the need for information and knowledge flow. Systems are designed to be more connected, more integrated and more functional to deal with the needs that this new knowledge economy defines.

The competitiveness of the current business environment led to the advent of much more ambitious application packages. Previous legacy systems were unintegrated and focused on the support of activities in individual business function areas. However, the need for integration, flow and transparency of information across functional departments culminated in the advent of packages called ERPs. “The ERP name reflects the manufacturing roots of these systems – it’s a modification of ‘MRP’ (Manufacturing Resource Planning)” (Davenport, 2000:2). Originally designed for inventory control, their processes are built off a mechanical¹ way of processing. It is a system defined by structure, control and rigidity of processes to meet organisational requirements; what distinguishes them from other ISs are their scale, complexity and potential for organisational impact (Kallinikos, 2004; Koopman & Hoffman, 2003; Beaudry & Pinsonneault, 2005; Ferneley & Sobreperéz, 2006; Ignatiadis & Nandhakumar, 2009; Strong & Volkoff, 2010).

¹ The mechanical process will be discussed in detail in section 2.4.2.

The two definitions below of an ERP system, as defined by the literature, support the argument thus far.

Definition 1: “Enterprise Resource Planning (ERP) systems are core software used by companies to integrate and coordinate information in every area of the business. ERP programs help organizations manage company-wide business processes, using a common database and shared management reporting tools” (Monk & Wagner, 2013:1).

Definition 2: “ERP systems form a complex series of software modules used to integrate many business processes” (Avison & Fitzgerald, 2006:183).

The definitions assist in quantifying the notion of an ERP system and the role it plays with regard to business process integration and flow across the organisation. As defined by Davenport (2000), these systems aid organisations in overcoming the constraints defined by the current information age. Globalisation enhanced the need to cope with ever-increasing demands for output and dealing with change and flux of information. Organisations therefore adopted integrated information packages such as ERPs to cope with such extremities.

ERPs offer potential benefits to organisations by means of the integrated functionality that the system provides. Organisations can manage company-wide information flow and streamline processes to be more viable and competitive. However, Orlikowski and Gash (1993) state that a technological artefact (such as an ERP) is simply a tool employed to support information integration and process flow in an organisation’s IS. Their theory argues for the congruency of technology in that “because a technological artefact may be interpreted differently by multiple social groups, different social groups will construct different interpretations of the technology based on their interactions with it. Such interpretations, to varying degrees, are shaped and constrained by various groups’ purpose, context, power, knowledge base, and the artefact itself” (Orlikowski & Gash, 1993:181). In the context of the study, this understanding of the role of ERPs as a technological artefact in ISs and users’ interpretation is fundamental.

Structure and embedded processes are well defined and coded into the ERP. “Best practices” are built in and follow a rigid and controlled process. These are seen as enabling the organisation to achieve the outputs required. However, it is the users of the system that ultimately define success (Kallinikos, 2004; Boudreau & Robey, 2005; Alvarez, 2008). Their enactment of the system will constitute whether or not these defined business processes will achieve the desired goals. It is

therefore important that the research is focused not on the technical artefact itself, but rather on the end users.

Due to the technical nature of the system, literature is generally produced from a hard system's thinking perspective. The perspective states that organisations "are goal-seeking entities, with managerial activity being seen as decision-making in pursuit of the declared goals" (Checkland & Holwell, 2005:69). Developed from this line of thinking, arguments focus on three key principles, namely selection (Stefanou, 2000; Bernroider & Koch, 2001; Verville *et al.*, 2002; Wei *et al.*, 2005), implementation (Nah *et al.*, 2001; Hong & Kim, 2002; Umble *et al.*, 2003; Lee & Lee, 2010) and adoption (Jang *et al.*, 2004; Laukkanen *et al.*, 2005; Law & Ngai, 2007). The research and literature produced on these three perspectives are extensive, the majority focusing on organisations as 'hard' goal-seeking-machines (Checkland & Holwell, 2005).

Research into the soft interpretative stand of IS is limited. Both Checkland and Holwell (2005) as well as Jackson (2003), support the need for "an understanding of human affairs in general, and organisational life in particular, Vickers started by rejecting the goal-seeking model of human behaviour as being too poverty-stricken to match the richness of life as we experience it" (Checkland & Holwell, 2005:46-47). Research into the complex social processes of organisations adopting large IT artefacts is an area in the IS field that requires further research and analysis. This study aims to contribute to this understanding.

As stated in the "motivation for research" section in the introductory chapter of this thesis, there were "only a few studies investigating issues relating to the post implementation of ERP systems" (Ignatiadis & Nandhakumar, 2009:60). Therefore the review will address post-implementation research and focus on the soft issues (Checkland, 2001; Jackson, 2003) identified in the current literature.

2.2.1 ERP Systems Post-adoption

Research, although rather limited, into post-adoption of ERPs tended to slant towards the effects on performance and structure in organisations due to its large and complex nature. Key authors in the literature, such as Sia and Soh (2002, 2004, 2007) as well as Strong and Volkoff (2010), focus on the misalignments between the structures embedded in the ERP and those embedded in the organisation. Other researchers such as Ignatiadis and Nandhakumar (2009) investigated the effects of organisational controls and efficiency. Kallinikos (2004), Azad and King (2008) as well as Ignatiadis and Nandhakumar (2009) began the process of unpacking the dynamics of Information

Packages such as ERPs to understand the organisational and behavioural implications post-adoption.

Recent literature began to explore post-implementation success from an empirical perspective. Zhu *et al.* (2010) conducts an analysis of the Chinese retail industry, analysing the identified factors that lead to post-implementation success. Their research extends the *TOE theory*, namely Technology, Organisation and Environment. By adopting the theory they were able to analyse the post-implementation success of the system based on quantitative data. The research addressed a multitude of factors including the implementation quality, organisational readiness, leadership involvement, organisational fit and external support. The research introduced different dynamics that lead to the post-implementation factors of success in ERPs. Post-adoption success factors were also attributed to the organisational culture and environmental influence. Wang and Chen (2006) as well as Sia and Soh (2007) conduct further research into the effects of the external environment on ERP success, arguing that “best practice” methodologies and *vanilla* implementation developed largely by the United States and Western Europe does not necessarily coincide with emerging economies, with specific reference to Asia and Easter Europe. The research indicated that “some of the changes may adversely affect operational efficiencies and may even undermine the organisation’s customer service, and competitiveness” (Sia & Soh, 2007:572).

2.2.2 ERP as an Instrument of Control

Further post-adoption studies of ERPs focus on the artefact as an instrument of control and the effects this has on the organisation. Research conducted by Ignatiadis and Nandhakumar (2009) reported on the soft issues related to ERPs and the issues developing due to rigid control mechanisms enforced by the system. The research examined ERPs’ effects on end users enactment. The loss of control identified was seen as a direct result of “not [taking] account for the way the system was used by its users” (Ignatiadis & Nandhakumar, 2009:22). Research conducted by Beaudry and Pinsonneault (2005) extended this by addressing how users respond to issues of control. Drawing on *Coping Theory*, they address four adoption strategies² enacted by users to deal with issues faced. “Users assess how much control they have over the IT [artefact] event and what their adoption options are given the resources available to them” (Beaudry & Pinsonneault, 2005:499).

Research into organisational control partially addressed the notion of enactment by recognising that users are not merely passive adopters of IT artefacts. This line of research resonates well with Anthony Giddens’ *Structuration Theory* and was extended to IS by, in particular, Orlikowski

² Benefits maximizing, benefits satisficing, disturbance handling and self-preservation.

(1992) and DeSanctis and Poole (1994). These scholars recognise and explore the role of user agency in structuring organisational reality through the enactment of IT artefacts. Their ideas are developed further in the work of Pozzebon and Pinsonneault (2005), who investigate the instrumentalisation of Structuration Theory for research in IS contexts. Jones and Karsten (2008), accordingly, conduct research into the social phenomena produced and reproduced regarding ISs and analyse these in terms of structuration. They argue that “human agents draw on social structures in their actions, and at the same time these actions serve to produce and reproduce social structure” (Jones & Karsten, 2008:129). Structuration Theory contradicts the notion of *Technological Determinism* (Jackson *et al.*, 2002) which dictates that IT artefacts determine the development of social structures and culture in organisations. Structuration Theory and the notion of artefact enactment are, of course, a key aspect of post-adoption ERP success.

2.2.3 ERP as a Context of Study

The majority of the literature on post-adoption ERP behaviour and subsequent outcomes of such social enactments is focused on the phenomenon of “workaround practices”. The review of the literature on this post-adoption behaviour is critical to the study and will subsequently be examined in section 2.5. Post-implementation phenomena recognised in the literature are not only result of technological artefacts such as ERPs. Rather, the phenomena is a characteristic of IS and the social-technical nature of the system, where a user enacts the technology. An ERP system, although important to the study of business processes, should not be described as the only contextual setting in which such post-adoptive behaviours are experienced. The artefact is rather an environment in which to analyse and conduct research into such social phenomena (such as workaround practices). Therefore the context in which the research is conducted is important, but is by no means defined only in terms of an ERP system. This is merely the context that facilitates understanding such enactments.

2.3 Business Processes and Development of the BPI Framework

As is seen from the literature thus far, IS artefacts, such as ERPs, help organisations to manage company-wide business processes. A basic definition of a business process is as follows:

A business process is a collection of activities that takes one or more kinds of input and creates an output, such as a report or forecast, that is of value to the customer. ERP software supports the effective operation of business processes by integrating tasks

*related to sales, marketing, manufacturing, logistics, accounting and staffing – throughout a business. This cross-functional integration is at the heart of an ERP system.*³

The concept of a business process can be drawn from multiple fields characterising a business function that creates a resultant output. ISs prescribed business functions that are built into the structure of the artefact. A business function comprises activities that are central to the specific functional area of operations. Examples⁴ of these activities are given below:

Marketing and Sales: Marketing a product; taking sales orders; customer support; forecasting; advertising.

Supply Chain Management: Purchasing goods and raw materials; receiving goods and materials; transportation and logistics; scheduling production runs.

Accounting and Finance: Payments from customer to supplier; cost allocation and control; planning and budgeting.

Human Resources: Recruiting and hiring; training; payroll.

As described by Monk and Wagner (2013), these functional areas define the structures of the organisation with multiple elements and business processes functioning in each segment. As noted, the ERP system looks to integrate this information into one artefact with multiple integrated business functions being performed across boundaries and divisions. This integrated nature caused both managers and researchers alike to not only analyse organisations in terms of their defined structures, but also in terms of the business processes functioning in them.

Davenport (2000) states that the integrated nature of the system aided in organisations producing faster cycle time, faster information transactions and better financial management and making tacit process knowledge explicit⁵. The business process is therefore a key element in the functioning of the artefact. A review will therefore be given of the current field of business process management followed by an examination of business process outcomes. The relation of the business process to organisational policy, structure and culture will then be analysed, with the section culminating in a review of the key characteristics of a Business Process and its relation to Integrity. As a result, an integrated theoretical framework will be introduced.

³ Monk & Wagner (2013:1).

⁴ Examples illustrated in Monk and Wagner (2013).

⁵ Nonaka (1994) and Newell *et al.* (2009) refer to “tacit knowledge” as the knowledge that individuals have based on their personal experience that is hard to express or articulate. This can be converted into “explicit knowledge” that can be spelled out or written.

2.3.1 Business Process Management (BPM)

BPM “includes concepts, methods, and techniques to support the design, administration, configuration, enactment and analysis of business processes. It is the explicit representation of business processes with their activities and the execution constraints between them” (Weske, 2007:5). The field involves the analysis, improvement and enactment of a business process in an organisation. The field examines systems that are used to execute such a process (in this case the ERP), the models that consist of a set of activities or actions performed to execute a process (Business Use Case⁶ and Activity Diagrams⁷) and the specific instances of this enactment (Actors⁸).

The focus of the research study conducted is the enactment of a business process. Weske (2007:14) states that the enactment process or phase involves the “business process instances that are initiated to fulfil the business goals of a company”. It follows a designed process flow to reach a specific outcome for the organisation.

2.3.2 Business Process Outcome (BPO)

ERP packages, as stated in section 2.3, are designed to produce a configured outcome. The design of the system, and specifically the business process integrated into it, ensures that the flow of activities is completed as intended. The “Happy Scenario”, as Podeswa (2010:109) refers, is “the basic flow [that] describes the most common way that the use case plays out successfully”. This scenario involves a collection of activities that complete a process and, in doing so, create an output that is according to the intended design. The BPO is directly related to the efficacy of the system to achieve the business objective.

Research conducted into BPO in terms of ERPs is rather limited. Karimi *et al.* (2007) conducted an empirical investigation into the impact of ERP implementation on BPO. The study directs attention towards factors that aid and hinder the outcome of the business process. The scholars identify three key factors to measure BPO, namely process efficiency, process effectiveness and process flexibility. The measurement criteria are defined as follows:

⁶ Business Use Case: “A tool for identifying and describing end-to-end business processes affected” (Podeswa, 2010:34).

⁷ Activity Diagram: “Shows the workflow of each business use case”. Actors: “Users and external system that will interact with the system” (Podeswa, 2010:34).

⁸ System Use Case: “Used to help break out the end-to-end business processes into meaningful interactions with the system” (Podeswa, 2010:34).

Process efficiency was measured by the extent to which the use of the ERP implementation reduced the operational costs and decreased the input/output conversion ratio. *Process effectiveness* was measured by the extent to which the ERP implementation provided better functionality, enhanced the quality of the users' work in terms of better access to corporate data, higher level of enterprise wide data integration, better sales forecasts, and improved quality of operations. *Process flexibility* was measured by the extent to which the ERP implementation had provided firms with more flexibility in response to changing business environments by providing new ways to customize their processes and become more agile.⁹

The criteria posed by Karimi *et al.* (2007) are directed specifically at the effects of ERP implementation on the outcome of the business process. The research conducted provides a valuable starting point to analyse the post adoption effects of ERPs and the relation to BPO. However, the model of BPO prescribed by Karimi *et al.* (2007) is not defined in relation to the post-adoption effects that are under analysis in this research study. It is for this reason that the explanations developed by the authors cannot be applied in parallel to this research study. Rather the basic concepts put forward can be adopted and modified to indicate the post-adoption effects and the relation to BPO.

The business processes available to organisations through ERPs prescribe the necessary functionality to enable process efficiency, effectiveness and flexibility. However, in many instances “the sequential unfolding of organisational tasks does not necessarily coincide with what is often referred to as a business process” (Kallinikos, 2004:16). The business process built into the system is enacted in a way that is contrary to the intended design and thus produces unintended consequences. This alternative enactment is what defines this research.

Empirical investigations into the outcomes of business processes and issues relating to tasks not coinciding with the designed scenario are examined in terms of Information Integrity. Boritz (2005) conducted an analysis of the core enablers of Information Integrity and developed a framework to analyse these attributes. The attributes included Accuracy/Correctness, Completeness, Timeliness and Validity. The research addresses the key dimensions of Information Integrity that effect the outcomes of the business process. Information Integrity is adopted in the development of the integrated framework in section 2.4.5.

⁹ Karimi *et al.* (2007:111).

2.3.3 Characteristics of a Business Process and the Integrity Dimension

Each organisation is different and requires distinctive outcomes from business processes as defined by their environment, policy, structure and culture. ERPs look to achieve these outcomes in terms of the “best practices” built into the *vanilla* processing of the system (Swan *et al.*, 1999). The principles of control and the business processes integrated into the system define the artefact. However, instances develop where certain outcomes produce unintended consequences (Kallinikos, 2004). By identifying specific dimensions of a business process, we can begin to unpack the dynamics that constitute integrity in terms of outcome. The literature will be reviewed by addressing the characteristics defined by BPM and therefore introduce what constitutes a successful and consistent business process.

The concept of integrity can be defined as the “quality of moral self-governance at the individual and collective levels. It is derived from Latin, meaning wholeness, completeness, conscientious coherence, or committed responsibility” (Petrick & Quinn, 2000:4). Integrity in the context of organisational processing falls in the realm of business ethics. The concept can be defined as the completeness, accuracy and validity of a business process or outcome being produced (Boritz, 2005). Research conducted by Boritz (2005) addresses the integrity of a business process in relation to Information Integrity. The focus of the study centres on the effect that a loss of integrity will have on the information outcome. Information produced by the ERP is fundamental to the outcome of a business process; a loss of integrity adversely influences the BPO.

Research into BPO is also analysed in terms of flexibility and the effect of dimensions such as uncertainty, variability and time-criticality (Gebauer & Schober, 2006). Other academics subsequently identified specific strategies that can influence business process characteristics such as flexibility, reliability and responsiveness (Wieder, 2006). The majority of research consequently focuses on key implementation strategies that look to define the business processes in terms of the organisation. The strategies aid the understanding of how organisations can adapt their operations to “fit” the structures of the artefact and gain the required flexibility (Hong & Kim, 2002). These studies are focused on the theory of change management and subsequent implementation research into ERPs (Klaus & Gable, 2000; Umble *et al.*, 2003; Gebauer & Schober, 2006; Wieder, 2006).

Karimi *et al.* (2007) identify key characteristics of business processes that can be measured. These include efficiency, effectiveness and flexibility. These three characteristics provide a solid foundation for what constitutes the required outcomes of a business process. However, as stated previously, the development of the framework by the authors is based on ERP implementation and therefore cannot be directly applied to business process integrity post-adoption.

2.3.4 Business Process Integrity (BPI) Framework

A business process that enables the organisation to produce an output (goods or services) that is according to a business goal and is accurate in terms of information, complete in terms of output, in the designated time and meets the quality standards set, is seen to have integrity. The key characteristics that constitute and define the dimensions of integrity need to be explored further. The literature presented above addresses some of the dynamics involved in BPI; nevertheless further analysis needs to be conducted.

The concept of BPI is relatively under-researched in the field of IS and thus no common working definition is provided for what constitutes business process integrity. This section will attempt to answer a secondary research question put forward in chapter 1:

- what constitutes business process integrity in organisations adopting propriety ERP products?

The framework developed in this section will develop separate dimensions that together constitute business process integrity in organisations and in doing so answer the research question posed. The integrated framework is generic in the sense that it can be applied to any organisation that adopted an artefact or IS that governs the business processes. These could potentially include ostensibly professionally orientated organisational environments such as manufacturers or retailers and other public entities such as academic institutions. It therefore is designed in a manner that is not centred on one type of organisation, but rather a large organisation that adopted an IT artefact (which is embedded in the processing and structures of the system). The framework is defined by five identified dimensions. Each dimension will be analysed individually.

2.3.4.1 *Efficiency*

Efficiency is a dimension identified as leading to a successful BPO. It can be described as the extent to which the business process is completed in a manner that reduces operational costs and decreases the input-to-output conversion ratio (Karimi *et al.*, 2007). Therefore the goal of efficiency in terms of BPI is related to a reduction in cycle time and increased productivity of the process completed. It results in “achieving desired effects or results with minimal waste of time and effort” (Clegg *et al.*, 2006:52). If the integrity of the dimension is upheld, it will increase the speed of delivery of an output as well as reduce the time and cost thereafter.

A hindrance to the integrity of this dimension will involve the decrease of production yield by the organisation and result in increased rework needed to complete the intended business process. These impediments to the business process will directly affect both cost and time.

2.3.4.2 *Effectiveness*

Effectiveness in relation to the business process involves enhancing the quality of work produced by end users and better access to complete and correct information or data. An increase in the accuracy of the data produced will result in a more effective information processing system that adds value to operations. If the integrity of the dimension is upheld, decision-making, planning, resource management and delivery will improve (Karimi *et al.*, 2007). Increased effectiveness results in increased quality, value and accuracy of the business process.

A hindrance to integrity results in a decrease in the value of operations, a decrease in access to correct data and information and a decrease in the functionality of the system. The business process will also be crippled by the fact that integration is hindered. The resultant outcome is a decrease in quality and service of output produced by the business processes.

2.3.4.3 *Flexibility*

The flexibility of the business process is the ability of firms to adjust to changing environments. Gebauer and Schober (2006) identify the ability to accommodate a certain amount of variation regarding the requirements of the organisation as a key characteristic of a business process. The ability to adapt business processes to the needs and demands of the environment is essential in the current information and knowledge economy. Organisations are required to be more agile in their processes and as a result be able to accommodate variation in business processes.

Hindrances to flexibility and the subsequent integrity of the business process result in the organisation being unable to adapt to changing requirements or business environments. This hindrance to the integrity of the dimension can result in decreased agility and customisation of the processes to meet requirements. This results in decreased extensiveness of operations and lack of support for the system, leading to increased cost, loss of output and loss of vendor input.

2.3.4.4 *Policy Adherence*

A key dimension not addressed by the literature is that of policy adherence. The policy in an organisation has a major effect on the enactment of end users of the system. Policy is enforced to ensure that the organisation is conducting operations in a manner that is in line with both ethical considerations and according to laws and regulations enforced by the environment. It ensures that

output is in accordance with the intended design of the business process. Policy adherence in the business process warrants a fair, equitable, competitive and cost-effective system and ensures that fraud or corruption is not committed in the process (Alvarez, 2008; Azad & King, 2008). Another important dynamic is values and culture in the organisation (Hofstede, 2001). If users enact a business process with the correct moral integrity, the policy embedded in the process will produce an outcome that meets the integrity dimension. There is a strong correlation between leadership principles and the value dimension of the organisation when referring to policy adherence. A hindrance to the integrity of the policy has obvious implications. In the majority of cases these implications result in fraud, corruption and favouritism in the organisation. This results in a decrease in competitiveness and an increase in unauthorised and irregular expenditure.

2.3.4.5 *Traceability*

Another key dimension that the literature does not directly address is that of traceability in relation to the integrity of the business process. Traceability is defined by acceptable internal controls to ensure that end users comply with the rules defined by the organisation (Strong & Volkoff, 2010). It allows the organisation to monitor performance and, in doing so, enhance their strategic decision-making and information control. The dimension is comparable to Clegg *et al.*'s (2006) research into organisational power. They argue that the surveillance of end users will define the way in which they enact technology. The premise extends the theory in that a certain level of traceability of this enactment will support the outcome of the business process.

A lack of traceability causes the loss of the artefact as a “system of control”, resulting in outcomes that are not according to the intended design of the business process (Ignatiadis & Nandhakumar, 2009). Individuals are free to enact technology in different and unintended ways (Boudreau & Robey, 2005). However, if the traceability of the enactment is hindered, it affects the integrity of the business process and indirectly the BPO. This leads to corruption and fraud as well as unauthorised or irregular expenditure. Too much control, as will be argued, can also influence the integrity of the business process. Users will not be able to complete their activities in an efficient and effective manner and therefore hinder the integrity. The traceability dimension is therefore important in terms of the outcomes of a business process. However, the mechanism to enforce this traceability needs to form a cumulative balance.

These dimensions are represented in table 1.

Table 1: BPI Framework

BPI Dimensions	
<i>Dimension</i>	<i>Definition</i>
Efficiency (ECI)	“reducing cost and cycle time, increasing productivity process and improving quality and service”
Effectiveness (ETI)	“improving decision-making, planning, resource management and delivery. Increased functionality, enhanced quality of users’ work, access to data and information, high-level data integration, data forecasts and improved quality of operations”
Flexibility (FXI)	“more flexibility in response to changing business requirements or environments”
Policy Adherence (PAD)	“fair, equitable, competitive and cost-effective system and minimises fraud, corruption, favouritism as well as unfair and irregular practice”
Traceability (TRC)	“acceptable internal controls to ensure that end users comply with rules and legislation of the LGO and monitoring performance in the process”
<i>Process (Operational) Integrity</i>	“ensure that the business process does not affect end users’ operational capacity at later stages in the process conducted”
<i>Information (Data) Integrity</i>	“ensuring that the business process does not affect end users’ operational capacity at later stages in the process conducted”

It is beneficial at this point to provide a working definition for what constitutes business process integrity and its applied meaning on a meta-level:

Business Process Integrity (BPI) constitutes the completion of a standard business process in a manner that is efficient, effective, flexible, adheres to policy and can be traced within the ERP system. In order for integrity to be upheld, each dimension must be adhered to entirely.

The enactment of end users in the system is the overarching principle of BPI and the dimensions defined. Each dimension is influenced by the ways in which users enact technology and the subsequent effects of this enactment. The underlying construct governing this enactment is the values installed in the organisation, with each integrity dimension affected by the values and culture embedded. Management and leadership principles based on a collective culture can prescribe this in order to complete a business process in accordance with the intended design. Leadership in the

organisation facilitates the creation of the prescribed culture and values required to ensure the success of the BPI dimensions¹⁰.

The complex and underlying soft issues of the BPI framework is important, as they have a direct effect on the end users' enactment. This enactment is determined by a multitude of factors that affect the way in which they complete a segment of the business process. These include policy, management, developers of the system, external environmental factors and the artefact itself¹¹. These factors form the basis of how users will look to uphold the integrity of the business process.

2.4 Workaround Practices in Enterprise Resource Planning Systems

A basic process is a “specific ordering of work activities across time and place, with a beginning, an end, and clearly-defined inputs and outputs: a structure of action” (Davenport, 2000:137). The definition seems straightforward, to reach an outcome according to the structures defining the action. The majority of research is positioned on this definition, and for good reason. It is the principle construct of how a system *should* function. However, the organisational and specifically behavioural element of the enactment of such a defined process is often overlooked. The focus of this research is on understanding how human agents enact technology and the resulting soft issues experienced. As a result, the current research will focus on how large IT artefacts, defined by structure and rigidity, are enacted in a way that does not coincide with the intended business process. Such enactment is referred to as a “workaround practice” in the literature. The following section will unpack the dynamics that lead to end users' enactment, focusing on workaround practices and in doing so, lead towards the diminutive literature published on the phenomenon.

Before unpacking the dynamics of workarounds and creating an argument as to their enactment, it is beneficial to provide a definition of what constitutes a workaround practice. Azad and King (2008) apply the following definition, which is developed from Koopman and Hoffman (2003) and will thus for the working definition of workaround practices adopted in this thesis:

¹⁰ The effect of values and culture on the organisation in terms of BPI is beyond the scope of this research. However, future research can be done into the effects it has on enactment and the integrity of the business process.

¹¹ Factors effecting enactment is discussed further in Section 4.2.1.

*Computer workarounds are a post-implementation phenomenon widespread in organisations. They are commonly defined as non-compliant user behaviours vis-à-vis the intended system design, which may go so far as to bypass the formal system entirely.*¹²

Fereneley and Sobreperéz (2006) argue that a workaround is performed due to a mismatch between expectations of technology and actual working practices in an organisation. Boudreau and Robey (2005:3) explain it in terms of workarounds in IS literature where “stakeholders exercised social influence to change a pattern of use”. Other scholars such as Kallinakos (2004) and Ignatiadis and Nandhakumar (2009) explicitly identify human agency, as users are free to enact technology, in terms of workaround practices in IS.

In most instances the literature directly or indirectly identifies workarounds in terms of impositions or deficiencies in the system. Users’ experiences of these problems are argued to be root causes of workarounds and their subsequent enactment. The review will therefore analyse the notion of misfit as described by Strong and Volkoff (2010), Sia and Soh (2004; 2007) and other related literature to gain an understanding of this influencing phenomenon. Once this is generated, a review of the literature on workaround practices will be presented in the context of the study.

2.4.1 The Fallacy of the “Best Practice” Approach

The development of theories about ERPs began to focus on the differentiation between what was expected to happen and what actually happens in organisations using such artefacts. The literature has been far-reaching and covers a wide range of different aspects of IS and their use in organisations. Swan *et al* (1999), who argue that the “best-practices” adopted by IS suppliers are both illusionary and potentially disruptive, published a key assessment of IS operations that lays the foundation for these theories. They stated explicitly in their research that societal and institutional context plays a major role in the effectiveness of the artefact with regard to the organisational processes and functions. The suppliers and developers of artefacts, such as ERPs, have a perspective that is developed from the *plain vanilla* approach in which a “one size fits all”. The argument rests on the fact that the system operates according to the most widely recognised way in which to conduct efficient and effective processing.

This argument consequently produced a number of disagreements from both industry and academics alike. Many believe that the “assumption of a single ‘best practice’ IS raises potential problems for users because it de-emphasises the importance of designing solutions so that they can

¹² Azad and King (2008:264).

be used appropriately within particular organisational and societal context” (Swan *et al.*, 1999:286). Newell *et al.* (2009) call it the fallacy of “best practice” knowledge in relation to Enterprise Systems. The theory is developed with the understanding that users enact technology in different ways and that the history, social structure, policy and even culture of the organisation play a major role in determining the processes and practices adopted.

It is important to not only understand the role and structure built into the technology in which suppliers’ “best practices” methodology is defined, but also the roles and structures developed from the social settings in which it is enacted. The argument is significant in terms of IS research, as it addresses specific problems that organisations with systems of this nature experience. Referring back to Structuration theory explained in the previous section, it looks to emphasise the socio-technical aspects of ERPs. Much of the literature at the very least recognised this social construct in IS, as identified by Griffen (1999), Jackson *et al.* (2002) and Askenas and Westelius (2003), among others. The literature highlights the socio-technical nature of technology and how organisations are complex social settings. They have different cultures, values and individual requirements that are not necessarily in line with what is perceived as “best practice”.

2.4.2 Organisations as Machines?

The fallacy of the “best practice” approach falls neatly in line with Morgan’s (2006) Organizational Metaphors, although neither literature refers to the other. Morgan stipulates that different organisations function in a multiple of different ways, one of which is that of a machine. The argument behind the machine metaphor explores how organisations function in a mechanical and structured way. They have interlocking parts that each plays a clearly defined role in the functioning of the whole. Tasks are straightforward, the environment is stable and the human elements of the system are compliant. An organisation functioning in a mechanical process would constitute a good “fit” with the structured process of the artefact. However, in large complex organisations that adopt artefacts such as ERPs, this machine-like processes are inherently inconsistent with requirements. Morgan (2006:27) recognises this and refers to the fallacy of “best practice” in that there is not “one best way to organise”. Therefore, in current complex organisations, this analogy is generally mistaken.

This is not to say that the machine metaphor would never apply. Some organisations function specifically in a mechanical and structured way to complete business processes. However, more complex activities require specific functions that are unique to a specific organisation. Large ERPs are often more in line with elements of transformation and flux with organisations needing to learn and adapt to environmental conditions (Morgan, 2006; Jackson, 2003). Consequently organisations

operate in different ways; not all can function correctly by simply reducing operations or business processes to a large series of procedural steps. Morgan's machine metaphor provides a frame in which to understand how artefacts such as ERPs are designed in a mechanical and structured way. It extends the theory to explain why business processes that users enact often do not "fit" the requirements of large complex organisations.

What is significant is "in understanding organisation as a rational, technical process, mechanical imagery tends to underplay the human aspects of organisations and to overlook the fact that the tasks facing organisations are often much more complex, uncertain, and difficult than those that can be performed by most machines" (Morgan, 2006:27). This mechanical structure, which can be argued to have been built into such artefacts as ERPs, assumes rational instruments to achieve certain goals. However, human agents are known to make irrational decisions¹³. Jackson (2003) explains further that it is "seen as neglecting the individuals who make up the organisation and as producing organisational designs that are too rigid in volatile environments" (Jackson, 2003:34). Organisations are unique, they have different means of processing and the way in which these operations are enacted affects the outcome.

Artefacts incorporate aspects of the machine metaphor in the designs and processes defined by the system. However, this leads to many limitations that are representative of problems that both users and the organisation experience. The individuals' enactment of the artefact is not taken into due consideration in large complex organisations that adopt integrated ISs. It is due to these mechanical limitations that individuals in such organisations began to find ways of working around problems of misfit or misalignments with the artefact.

2.4.3 Misfits, Misalignments and Impositions

The socially constructed approach to technology and the inherent mechanical nature of the artefact identify the problems that came about due to *vanilla* systems and "best practice" approaches. It is acknowledged throughout the literature that an ERP and its defined processes are unlikely to include all the functionality an organisation needs (Goodhue & Thompson, 1995; Kanellis *et al.*, 1999; Soh *et al.*, 2000; Soh & Sia, 2004, 2007; Strong & Volkoff, 2010). This issue prompted researchers to examine instances where the artefact hinders the completion of a process and subsequently affects the outcome. The "best practices" do not "fit" the requirements of the organisation. The literature refers to these issues as misfits or misalignments.

¹³ This correlates with bounded rationality as proposed by Simon and March.

Goodhue and Thompson (1995) analysed the link between IT and individual performance in IS. Their research looked specifically at the concept of fit, analysing how technology functions are supported and what is needed to achieve certain tasks. The theory is referred to as task-technology fit and extends the theory of DeLone and McLean (1992, 2003) that analyses user attitudes towards technology. Their findings highlighted the importance of fit between technology and user tasks in achieving success in organisations. The framework extended the theory on success factors of IS and raised the issue of misfit in IS literature.

The framework prompted further research into the question of task-technology fit, and specifically to what constitutes misfit in IS. Soh *et al.* (2000) produced an influential paper that examined organisations adopting ERP artefacts and the problems that were arising in their use. It was documented that a “common problem when adopting package software has been the issue of ‘misfits’, that is, the gaps between the functionality offered by the package and that required by the adopting organisation”. They state fairly explicitly that “organisations have had to choose among adapting to the new functionality, living with the shortfall, instituting workarounds, or customizing the package” (Soh *et al.*, 2000:47). The research identified instances of misfits experienced by seven hospitals in Singapore that adopted package software. Their findings extended the theory of misfit and subsequently addressed the ways in which users dealt with a situation in which the artefact did not fit the business process. This introduced the concept of workaround practices to IS literature.

Soh and Sia (2004) and Hong and Kim (2002) furthered their original research by analysing the fundamental differences between the structures embedded in the organisation and what is assumed by developers of ERPs’ “best practice” business model. They began to directly reflect the problems that Swan *et al.* (1999) and Soh *et al.* (2000) addressed in terms of *plain vanilla* systems adopted by organisations. The research proved rich and profound due to the fact that there was a major differentiation between Western Business Practices, as defined in an ERP’s “best practices”, and their area of focus: Asian business practices. The business conducted in Asia is characterised by different processes, controls, structure and culture to that of Western Business Practice.

The argument focuses on the “mismatch between the context of the implementation environments and context embedded in the package” (Soh & Sia, 2004:376). They created a valid distinction between imposed and voluntary structures in organisations and how these affected the misalignment problem that was occurring. Sia and Soh (2007) expanded this further to incorporate deep and surface structures in their original framework and expanded the knowledge base further with regard to ERP structural misalignments. The research into deep and surface level misalignments produced

a greater understanding of the sources of misfits and misalignments. The research highlighted the importance of organisational structure and the socio-technical nature of the artefact.

The types of misfits and misalignments that were identified prompted Strong and Volkoff (2010) to understand the full extent of organisational and enterprise system fit solutions. The theory is developed on the premise explained previously: that the artefact is designed to support generic and not the specific requirements of the organisation. Their work introduced six misfit domains, namely functionality, data, usability, role, control and organisational culture. These misfit domains expanded on Soh *et al.*'s (2000) original typology regarding misfits in organisations, as well as the work done by Soh and Sia (2004, 2007). The scholars identify two types of misfit in each domain, namely deficiencies and impositions.

Deficiencies refer to “problems arising from the Enterprise System features that are missing but needed” (Strong & Volkoff, 2010:737). Users cannot perform specific functions, as the system is missing the required functionality or control. Impositions involve the “Enterprise System requiring ways of working that are contrary to organisational norms and practices or that negatively affect organisational performance” (Strong & Volkoff, 2010:737). They arise from the inherent characteristics of the artefact. Impositions are important, especially with regard to ERPs that are integrated into the functioning of the organisation, as it focuses on the social interaction with technology and not just the business functionality itself.

Soh and her colleagues were interested in the misfits that arise in organisations as a result of implementing an ERP, as well as the structure effects of such an artefact. They introduced solutions that would resolve the misfit problems and indicated how this could lead to instances of “fit” and success in organisations. Strong and Volkoff (2010) expanded on this further by incorporating four types of structural levels that they identified from their research, namely physical, deep, surface and latent structures. Physical, deep and surface structures were already recognised in research done by Wand and Weber (1995). However, it was latent structures that served as their main contribution. Latent structures are not a direct design of the artefact, but are rather the outcome of the integrated nature of the software and the users interacting with the system. “They are not designed and scripted in the same way as the other structures, but arise from them as second order structures. Roles, Control Structures and organisational culture emerge from the way a set of deep, surface and physical structures are designed” (Strong & Volkoff, 2010:750). These latent structures provide a grounded framework to understanding the interrelated problems that occur from different misfits and the various domains in them.

The literature presented provides a progression with regard to the development of the socio-technical difficulties that organisations adopting ERPs experience. It briefly addressed the enactment of end users in order to deal with instances of misfit. The concept of a workaround practice to combat an instance of misfit is an area in IS that requires further attention. By understanding these socio-technical problems, we are better able to analyse why instances of workarounds develop.

2.4.4 The Basis of a Workaround Practice

The current literature acknowledges the existence of workaround practices and it being enacted by individuals using ERPs in their organisational processes and business functions (Boudreau & Robey, 2005; Ferneley & Sobreperéz, 2006; Alvarez, 2008; Azad & King, 2008; Ignatiadis & Nandhakumar, 2009). The literature is, however, limited to a few key publications. There is a unified acknowledgement of the need for further research to be conducted into the multiple dimensions of workaround practices in organisations that adopt large IT artefacts (Boudreau & Robey, 2005; Ferneley & Sobreperéz, 2006; Azad & King, 2008; Ignatiadis & Nandhakumar, 2009).

The workaround phenomenon positions itself adequately in the literature, taking a natural progression from the concepts of misfits and misalignments with the mechanical nature of the artefact. This is evident in human agents creating workarounds due to deficiencies in the system (required features, data and access not available) or impositions (where the system is insufficient, ineffective or cumbersome).

Koopman and Hoffman (2003) initially introduced workaround practices as a social enactment. The authors addressed the issue by recognising its infancy in the field of IS. Consequently, their paper introduced basic definitions as to what constitutes a workaround practice. They explain that “a block can occur when you don’t know whether a path to your goal even exists. A block can also occur when a known path is confusing, laborious, broken or otherwise hostile” (Koopman & Hoffman, 2003:71). Their definition (although not directly referred) addresses deficiencies and impositions defined in the misfit literature. Their understanding of the problems that users face resulted in the development of four different types of workaround practices. These are completing tasks despite design flaws, completing tasks despite design component failures, extending functionality and users intentionally misleading their computers. The research, although not directed at ERPs, identified how users are faced with problems in IT software and how they enact solutions to such problems.

The work of Koopman and Hoffman (2003) opened up a new area of research into IS that, coupled with the literature on misfits, enabled academics to explore this post-implementation phenomenon. Scholars began to unpack the complex socio-technical nature of workaround practices in large integrated artefacts such as ERPs. Boudreau and Robey (2005) examined how users execute a workarounds for different reasons, such as working around the system to achieve desired goals that the system does not allow for. Azad and King (2008), Kallinikos (2004) and Alvarez (2008) investigated how users bypass control functions to be more efficient as well as effective. Ferneley and Sobreperez (2006) analysed how users bypassed the systems' built-in functions that were seen as irrelevant or time-consuming. They all identify instances of workaround practices that developed due to misfits or misalignments with the artefact. They build on this by analysing the socio-technical nature of IS.

Academics similarly argued that workarounds occurring in complex systems can be both positive and negative. This depends on the process completed, the structure of the organisation and the context of the need to workaround. Ferneley and Sobreperez (2006:354-355) state that "rather than resistance or workaround behaviours existing in a fixed or static context, there are many occasions when they may be viewed more dynamically and with differing positive or negative emphasis according to the organisational status and position and individual perceptions, beliefs and attitudes of the particular witness". Recognition needs to be given that certain workarounds become essential, others are harmless and some can hinder the processing of the system. People enact technologies in different ways and are influenced differently by the technology. There is a socio-technical aspect that forms the foundation of workaround practices and it is in principle the key element to any theory on IS.

2.4.5 Human Agency Perspective

Workaround practices are grounded in a theory that became the dominant perspective for this specific research in the field, namely the human agency perspective. The theory "suggests that humans are relatively free to enact technologies in different ways. They can use it minimally, invoke it individually or collaboratively and improvise in ways that produce novel and unanticipated consequences" (Boudreau & Robey, 2005:3-4). It resonates with the social constructionist approach incorporated by Jackson *et al.* (2002), Askenas and Westelius (2003) and Griffen (1999). The theory proposes that both technology and social systems are intimately connected and not separate entities. Structuration Theory is at the heart of this, whereby "structure and agency are mutually constitutive duality. Social phenomena are not the product of either structure or agency, but of both" (Jones & Karsten, 2008:129).

Human agents enact technology in different ways, in which they selectively use or misuse functions of the system that are not in line with the intended business processes or policy. This points to the development of workarounds and/or shadow systems that in turn produce and reproduces the social structure (Kallinikos, 2004; Boudreau & Robey, 2005; Azad & King, 2008; Jones & Karsten, 2008). Human agency is far more complex than simply recognising that human agents are passive adopters of IT artefacts, as this enactment has the capability to sustain certain structures and to transform them. “Every engagement with a technology is temporary and contextually provisional, and thus there is, in every use, always the possibility of different structures being enacted” (Boudreau & Robey, 2005:4).

Structuration Theory and the role of human agency in structuring organisational reality through the enactment of IT artefacts is key to the development of social structures and culture in an organisation. Consequently, it is a key element of the social phenomena produced and reproduced around such artefacts. This research has a specific focus on the enactment of users in relation to the artefact; the focus will centre on that. By introducing workaround practices in relation to human agency, a more complete understanding of the process that end users enact is developed.

The literature on workaround practices identified the interconnected nature of the artefact and the social structures in which it is enacted. As proposed by Simon, “users exhibit limited or ‘bounded rationality’, searching for decisions that are ‘good enough’ in the circumstances rather than optimal. ‘Problem solving’ is then a matter of closing the gap by finding a suitable means to achieve a goal” (Checkland & Holwell, 2005:45). Individuals enact technology in a multitude of ways. They adopt “satisficing heuristics”, seeking a course of action that is workable, but not necessarily the best or optimal option available (Phillips *et al.*, 2004). It is a complex social phenomenon that is defined by the users in an IS and the social dynamics that define such a system.

The human agency perspective therefore served to highlight the unanticipated consequences of individuals enacting technology and how they produce new unintended ways of completing their business processes. The way that human agents enact technology provides the platform for this study - to analyse the relationship between these workaround practices and the business processes. However, we need to understand how users of an artefact perform workarounds in a social setting to understand the relationship with business process integrity.

2.4.6 Workarounds in Practice

From the Human Agency perspective we created an understanding of how users are free to enact technology in different and often unintended ways. However, we still need to understand the methods identified as to how human agents actually perform these functions. Enactment therefore involves the users' actual conducting of workaround practices of an ERP system. Azad and King (2008) introduce the concept of Interpretative Flexibility to explain this enactment process when users "stretch the rules" to create a deviation that allows them to enact the system differently in order to complete desired tasks. The theory extends from the work of Boudreau and Robey's (2005) perceived inflexibility of the system's functioning, where users deviate from prescribed work processes and essentially "tweak the system" to make it respond to their needs. The authors argue that the enactment of this deviation requires social actors to accept it collectively and thereby affecting the social structures of the organisation. The "workaround adjustment reflects an effort to constitute an alternative social order, it is indicative of interpretive flexibility associated with the formal rules" (Azad & King, 2008:265). Therefore the socio-technical nature of the system needs to be explicitly recognised in order to understand how workarounds are performed by end users.

Throughout the literature on workaround practices, the majority recognises that the phenomenon does indeed exist and is derived from problems experienced with the system, such as misfits and misalignments (Hayes, 2000; Koopman & Hoffman, 2003; Kallinikos, 2004; Pollock, 2005). As the literature progressed and further research was conducted, actual instances of workaround practices were identified through empirical studies (Boudrea & Robey, 2005; Ferneley & Sobreperéz, 2006; Azad & King, 2008; Alvarez, 2008; Ignatiadis & Nandhakumar, 2009). These are important as they provide practical application to the theory of how the users of a system go about in dealing with inadequacies experienced and problems faced.

Ferneley and Sobreperéz (2006) address the following six basic categories that they identified in their research: "compliance", where users interact with the system as it was intended and therefore no workarounds develop. "Negative resistance", where users challenge the system's built in functionality, in which their behaviour (workaround) is one of entering incorrect data, deliberately missing steps or other means to deliberately oppose the system. "Positive resistance" is where users challenge the system in a way that is necessary to support and improve tasks. "Hindrances workarounds" are performed to avoid or bypass steps in the system seen as time-consuming, irrelevant and cumbersome. "Harmless Workarounds" do not significantly affect business processes. Finally, "essential workarounds", which are necessary to complete a task or business process.

Azad and King (2008) recognise the research done by Boudreau and Robey (2005) and Ferneley and Sobreperéz (2006) and note that the theoretical understanding of the inner workings and dynamics of computer workarounds remains elementary. They extended the theory on workarounds and begin to understand the social dynamics at play; how they are enacted and what this means in relation to the policy that the organisation adopted.

Based on the notion of flexible interpretation explained above, Azad and King (2008) introduced a notable workaround practice identified in their research into a health care IS, termed “concurrent approval”. Concurrent approval refers to an instance where the requirements of the organisation are not achievable due to restrictions in the system. In the case of the health care system, the policy states that a formal approval must be obtained prior to the writing out of the order for a specific drug. However, users of the system were able to bypass this or workaround it using “flexible interpretation” and thus meeting the needs and requirements of the patient. This was necessary, while not functioning in the control structures of the system, as it allowed for meeting the needs of the patient. Azad and King (2008:269-270) state that this social interaction, and therefore the collective interpretation, is agreed on and that the workaround “*modus operandi* purportedly satisfies the spirit if not the letter of the formal policy, as long as it is completed”. As a result, concurrent approval acts as a “meta-workaround”, in that it governs the behaviour of the other computer workarounds. It enables the completion of the process even though it is not defined as such in the formal policy.

This meta-workaround also contributed in some fashion to the spawning of other workarounds. They “observed rule deviation upstream led to further deviations downstream” (Azad & King, 2008:270) and it therefore was indicative of other workaround practices being performed in different parts of the organisational business process. They identify three other workarounds, namely habitual workaround practice¹⁴, verbal signature workaround practice¹⁵ and fail-safe workaround practice¹⁶. All these workarounds identified require a social interaction and collective agreement by human agents to enact this “alternative negotiated order”. Social interaction and collective agreement are recognised as a key attribute in the enactment, with the time of the enactment contributing significantly. The research therefore provides a framework for an analysis of how workarounds develop in an organisation that has different organisational processes and business functions, and that faces problems due to the complex socio-technical nature of the system.

¹⁴ Information transfer workaround derived from the theory of concurrent approval.

¹⁵ Explicit social interaction leading to a verbal agreement to workaround.

¹⁶ Triggers corrective action when needed.

Ignatiadis and Nandhakumar (2009) conducted empirical research into this form of enactment at a large organisation. They identified three further notable workarounds that users perform. Workarounds in “access profile” involved users not having the correct level of access to the system that they needed. A user would log into one terminal with required access and other users would use that profile as opposed to logging out and using their own access password. They identified workarounds using an “external system” to process data that would be difficult in the ERP. Microsoft Excel was a key external system adopted to offset certain instances of misfit. The final workaround identified is “data manipulation”. Users did not see the importance of entering data in a specific field due to environmental constraints. When dealing with the problem of moving prices, users would perform the workaround by entering fictitious data to complete the process.

2.5 Chapter Summary

The literature on the concept of workaround practices allows for a conceptualisation of the reasons for this form of enactment. It addresses specific issues related to human agents enacting the system in ways that are contrary to the intended business process design. By defining ERPs and their roles in organisations, we are able to grasp the dynamics of such complex and integrated artefacts. The focus on the post-adoption research introduces the structural effects that such a system imposes and how the socio-technical nature of the organisation influences users. The system is defined by the rigid control enforced on the organisation that determines the intended processes that need to be followed. Therefore, ERPs are placed in the context of the study, and their ability to manage company-wide business processes in accordance with the policy and procedures of the organisation is understood.

ERPs introduce the concept of business processes as defined by the broader BPM field. The dynamics of a business process, as presented in the literature, are introduced to form an understanding of how a collection of activities are enacted in order to produce input into output. Defining a business process according to the available literature enables the researcher to develop a proposed framework as to the dimensions that constitute integrity in the business process. The five dimensions recognised are a key element of the research design. The integrated framework is applied in the case study and allows for an analysis of workaround practices identified.

Following the development of the framework, a review is given on the literature published on workaround practices. The review develops an understanding of their influence on organisational operations. The concepts of misfits and misalignments are introduced to investigate the reasons for

their enactment. Consequently, this opens up the literature to the actual instances of workarounds researched in IS. This introduces the reader to the specific instances of workarounds identified as well as the processes undertaken to enact such processes.

The review constitutes the first of three sections in the research design. The introduction of the BPI framework enables the researcher to analyse workaround practices identified in the empirical study and conduct an analysis accordingly. The integrated framework provides the necessary means to answer the research question and draw out the relationship between the two constructs. An empirical investigation is used in the research study in order to identify workarounds in a large organisation based on the knowledge obtained in the review.

CHAPTER 3

EMPIRICAL INVESTIGATION

3.1 Introduction

The literature presented on workaround practices and business process integrity presented in the previous chapter lays the foundation for the empirical study conducted as part of this research study. The literature presented on workarounds, although limited to a few key authors due to its under-researched nature, is explored theoretically in order to understand the dynamic nature of this form of enactment. The development of the integrated BPI framework enables the researcher to conduct the empirical investigation and interpret the data to achieve results that are both plausible as well as beneficial in answering the primary research question. Therefore the following chapter provides a comprehensive overview of the empirical investigation. A description of the research study is explored to introduce the processes and procedures followed in compiling a data set that is suitable to answer the research question. The case study was performed by the Information Systems Research Group¹⁷ (ISRG) of which the author of this research was a member. The ISRG investigates a range of topics relating to the socio-technical dimensions of IT artefact adoption. This chapter provides a background of the organisation investigated and the methodologies followed during data collection.

The chapter consists of five main sections. Following the introduction, section 3.2 provides a case background. The background introduces the reader to a Local Government Organisation (herein called the LGO), what they do and the problems they experience. The problems identified make a case for answering the research question posed, and in doing so lay the foundation for the study. Section 3.3 describes the data collection methods adopted for the qualitative case study performed. The ISRG's collection of data involved both qualitative and quantitative methodologies; however, this investigation takes particular interest in the qualitative data, and the focus will fall on that. The analysis of the data collected is performed by adopting specific coding techniques to arrange phenomena identified into manageable chunks for analysis. The data analysis process is explained

¹⁷ IS Research Group, Centre for Knowledge Dynamics and Decision Making, Stellenbosch University.

in section 3.4 of the chapter, with the analysis conducted in terms of the BPI¹⁸ framework developed in chapter 2 of this thesis. Section 3.5 constitutes the final section of the chapter and comprises a chapter summary.

3.2 Case Background

The organisation selected for the case study is a South African metropolitan municipality. Government organisations perform various functions and duties with the goal of achieving growth in the Republic. This is significantly true for local government organisations. They strive to achieve development in social and economic factors in accordance with the requirements of the Constitution of the Republic of South Africa (herein referred to as “the Constitution”). As a result, a case background of the LGO under investigation serves to place the study in the context of the research question.

The initial background provided is developed from a higher-level description of what constitutes an LGO in South Africa. The goal is to not only introduce the reader to the dynamics of public organisations and what they represent, but to also gain an understanding of the roles and functions that they perform. This higher-level description serves as a platform to understand the fundamental problems facing such public institutions. In the context of the research, the problems addressed make the case for the applicability of the proposed research question.

3.2.1 LGOs in South Africa

According to the Constitution, “the local sphere of government consists of municipalities, which must be established for the whole of the territory of the Republic” (Republic of South Africa, 1996:1331). The executive and legislative authority of a municipality is vested in its municipal council. Therefore it has the right to govern, on its own initiative, the local affairs of its community, subject to national and provincial legislation. The objectives of local government are set out in Section 152 of the Constitution of the Republic as follows:

- a) to provide democratic and accountable government for local communities;
- b) to ensure the provision of services to communities in a sustainable manner;
- c) to promote social and economic development;
- d) to promote a safe and healthy environment; and

¹⁸ Business Process Integrity.

- e) to ensure the involvement of communities and community organisations in the matters of local government.

It is the role of national and provincial governments to support the capabilities of local government. This is to ensure that they can fulfil their roles as defined by the Constitution and exercise their powers to perform their functions as defined in legislation. Therefore it is the duty of municipalities in the Republic to structure as well as manage its administration, budgeting and planning processes in order to give priority to the basic needs of the community. They need to promote social and economic development and ensure that services are provided in an appropriate and sustainable manner (Republic of South Africa, 1996:1331).

The Constitution states three specific categories for defining municipalities in the country. These are depicted in Section 155 as set out below.

- a) *Category A*: a municipality that has exclusive municipal executive and legislative authority in its area.
- b) *Category B*: a municipality that shares municipal executive and legislative authority in its area with a category C municipality in whose area it falls.
- c) *Category C*: a municipality that has municipal executive and legislative authority in an area that includes more than one municipality.

The local government organisation that was selected for this research study falls in the Category A list provided by the Constitution. These are referred to as a metropolitan municipality. There are a total of eight metropolitan municipalities across the Republic that are set up and defined in accordance with both the Constitution and the Municipal Structures Act (Republic of South Africa, 1998:18).

3.2.2 Metropolitan Municipalities and their Role as LGO's

Memela *et al.* (2008) address the role of LGOs such as metropolitans in South Africa according to “good governance” principles. They highlight key points of reference towards the characterisation of good governance:

Governance is not just about how a government and social organisations interact, and how they relate to citizens, but it concerns the state's ability to serve the citizens and other actors, as well as the manner in which public functions are carried out, public resources are managed and public regulatory powers are exercised. The quality of

*governance, therefore, is measured in terms of how well various actors handle the rules that make up the basic dimensions of the political regime.*¹⁹

Memela *et al.* (2008) make a case as to what constitutes “good governance”, and in doing so address a multitude of dynamics at play in LGOs. The underlying theme is conducting business and governing in a manner that achieves the goals of human development. According to Memela *et al.* (2008), the municipal functions are and should be governed by human rights principles.

Metropolitan Municipalities play a key role in the context of human development and need to be structured under good governance principles. The control of such LGOs is held over the major cities in the country, and ensuring good governance is essential for success. These responsibilities include the effective functioning of political leadership, ensuring that specific functions are carried out correctly and that resources are managed in an effective and reliable manner (Republic of South Africa, 2003). Memela *et al.* (2008) identify the rules that govern these dimensions, with it serving as a measure of quality in the sphere of local governance. The rules (or essentially policies/acts) drive the functions of local government and ensure that “good governance” principles are upheld in the municipality. They are designed to safeguard the objectives of local governance expressed in Section 152 of the Constitution.

The policy or rules enforced form the foundation of this study and have specific relevance to the identified department in the LGO under investigation, namely the Supply Chain Management (SCM) department.

3.2.3 SCM and the Procurement Process

The success of LGOs in South Africa is largely attributed to their ability to provide the goods and services to a specific area in which they govern. Although this is only one of many functions, the ability to sustain growth often hinders this process. The resources available and the external controls enforced have an influence on this success. However, the ability of the LGO to manage its resources efficiently and effectively in the confines of its organisational structures is the most important aspect. A large portion of this success is centred on the Supply Chain Management (SCM) divisions in municipalities and how they function according to policy.

Supply Chain Management for metropolitans involves the supply and acquisition of goods or services for the area that they govern. Their duties include construction works, consulting services, disposal of goods no longer needed and the selection of contractors to assist in providing municipal

¹⁹ Memela *et al.* (2008:1). The state of local Governance in South Africa.

services. Section 111 of the Municipal Finance Act states that each municipality needs to have and implemented an SCM policy and that the policy must be fair, equitable, transparent, competitive and cost-effective. It is designed to ensure that citizens of the municipality have access to required resources that drive social and economic growth in accordance with the constitution and legislation in the municipal area (Republic of South Africa, 2003).

Section 115 (1) (b) of the Municipal Finance Management Act states that the accounting officer of a municipality or municipal entity must take all reasonable steps to ensure that proper mechanisms and separation of duties in the SCM systems are in place. This is to minimise the likelihood of fraud, corruption, favouritism and irregular practice occurring in SCM. However, irregularities with the procurement of goods and services have become a major issue in South Africa. A large stream of government revenue is lost as a result of mechanisms and policy procedures not being upheld (Auditor General of South Africa, 2011). Consequently, the question of control poses a major problem to LGOs and specifically metropolitans. If the available control mechanism does not enforce policy, it can result in unauthorised, irregular as well as fruitless and wasteful expenditure in the procure-to-pay process. Subsequently, a control mechanism to enforce policy is of paramount importance.

Metropolitan Municipalities in South Africa began the process of implementing artefacts such as ERPs as a rigorous form of control. Ignatiadis and Nandhakumar (2009)²⁰ make the argument proposed by Hanseth *et al.* (2001:34) that “ERP systems with their emphasis on integrating business processes, streamlining and standardization, are an ideal control technology”. It enforces the policy on the procurement process to decrease irregularities. The artefact acts as a monitoring or surveillance tool to ensure that the processes mapped out by policy are followed accordingly. In theory this sounds like an extremely viable solution to drive out elements of unauthorised and irregular expenditure. However, Ignatiadis and Nandhakumar (2009:62) are quick to point out: “the fact that more control can lead to more risks is explained with the ubiquitous nature of side effects. The more integrated from a technology and process point of view the organization becomes, the faster and further away the side effects have an impact, and the bigger the consequences”. This positions itself in the current research focus on workaround practices that are performed in municipalities that have adopted an ERP²¹. As a result, the problems LGOs experience is an area that requires attention.

²⁰ Explained in chapter 2, the Literature Review on the section pertaining to Organisational Control and ERPs.

²¹ These can subsequently be referred to as “Policy Workarounds”.

3.2.4 Motivation for Case Selection

The role of an LGO with regard to SCM involves stimulating local economic development, promoting resource efficiency and creating employment and business opportunities that are competitive in the procurement domain. However, question marks have been raised by the South African media regarding the ability of municipalities to achieve these goals. This causes multiple institutions, both public and private, to question the integrity of the business process in SCM. The following section will address these irregularities that were identified in municipal SCM divisions and in doing so provide justification for the chosen research focus.

3.2.4.1 *SCM Procurement Irregularities*

The Auditor-General of South Africa (AGSA)²² released the Consolidated General Report on the audit outcomes of Local Government 2010-11. The audit identified notable areas of concern regarding the results obtained from the SCM divisions in various LGOs. The audits included an “assessment of procurement processes, contract management and related controls in place. To ensure a fair, equitable, transparent, competitive and cost-effective SCM system, the process and controls need to comply with legislation and must minimise the likelihood of fraud, corruption, favouritism as well as unfair and irregular practices” (Auditor General of South Africa, 2012:63). The evidence generated from the report showed that R6,7 billion or 98% (an increase from 94% in 2009-10) of irregular expenditure was a direct result of contravention of SCM legislation. It is apparent from the report that inadequate control in SCM to apply with legislation hinders the Local Governments and specifically Municipalities to conduct procurement activities in line with applied policy. AGSA (2011:3) states further that “municipalities and municipal entities need appropriate, reliable and secure computer systems in order to effectively manage their finances. They also need to effectively manage IT to ensure uninterrupted service delivery and continuity of business operations”. Therefore, an artefact embedded in the processes of LGOs is imperative with regard to efficient and effective procurement procedures. Users’ enactment of processes in such artefacts proves a valuable area for research into BPI and workaround practices.

3.2.4.2 *Relevance of Study*

The research study focuses on workaround practices that end users of a large IT artefact perform, with an emphasis on the rigid control mechanism that these artefacts look to install. This rigidity is

²² AGSA is established in terms of section 181 (1) (e) of the Constitution of the Republic of South Africa, 1996 (Act no. 108 of 1996) as a state institution supporting constitutional democracy. The organisation annually produces audit reports on all government departments, public entities, municipalities and public institutions. It must audit and report on the accounts, financial statements and financial management according to Section 188 of the Constitution of the Republic of South Africa (Auditor-General of South Africa, 2012).

a key element in how business processes are performed in large organisations. For LGOs, ensuring that the business process is conducted according to legislation and policy is imperative. The report that the AGSA submitted resonates with this and addresses the issue of non-adherence to legislature. They state explicitly that:

*The level of service delivery to citizens and the degree to which government's socio-economic objectives are promoted are directly and significantly helped or frustrated by the degree to which the procurement systems in local government comply with the SCM legislation that endeavours to ensure a fair, equitable, transparent, competitive and cost-effective SCM system. Continued non-adherence to SCM legislation defers restoration of the public's confidence in the ability of state officials to systematically take care of their interests and deprive citizens of much-needed services.*²³

Artefacts such as ERPs are designed to increase the control and flow of business processes in the organisation to ensure that the LGO conducts operations that are in line with the SCM policy. However, the problems of irregularities and non-adherence are all too apparent. Users' performing workaround practices and the relationship with business process integrity serves as a valuable research area in the current South African context. LGOs can benefit from understanding this relationship in coming to terms with the complex social phenomena that result from instances of misfit with the artefact.

3.3 Data Collection

The data collection involved the use of an empirical investigation at a large LGO in South Africa. The ISRG at the University of Stellenbosch's Centre for Knowledge Dynamics and Decision Making performed the case study. The project involved various researchers, including the author, interested in the socio-technical aspects produced by an IT artefact post-adoption. While the project involved both qualitative and quantitative investigation, this investigation takes particular interest in the qualitative data, and the focus will fall on that.

The section introduces the qualitative methods adopted in the research study. A detailed description is provided of the data collection processes followed throughout the investigation at the LGO. Qualitative data included both documentation that the LGO supplied and interviews conducted with users of the ERP. Each method will be analysed individually.

²³ AGSA (2012:69).

3.3.1 Documentation

The first source of data collection is documentation. The data obtained includes external documentation available in the public domain as well as internal documentation that the Government Organisation made available to the researchers. Both sets of documentation were important as they provided insights into how the organisation functions as a public entity. Specific business processes that are planned out in the system were identified by means of the sets of documents obtained. Yin (2009:103) explains that “the most important use of documentation is to corroborate and augment evidence from other sources” in order to ensure that specific details hold true in specific settings. The documents provided important information about what the exact function of the organisation’s SCM department is, how they go about their daily processing and the rules that are in place to achieve this.

The SCM policy document is available in the public domain and was used extensively in the data collection process. However, internal documentation obtained from the LGO proved the most useful in the collection process. The internal documentation provided consisted of multiple activity diagrams²⁴. The researchers were able to see how the business processes mapped out were incorporated in the ERP being studied and correlate this with other data collection principles applied. The internal documentation provided the researchers with what Podeswa (2010:109) refers to as the “happy scenario”. This “basic flow describes the most common way that the use case plays out successfully. It reads as a straightforward narrative: ‘the user does ...; the system does ...’”. The activity diagrams (as with any model) are only a representation of the intended logical flow of the business process. However, as argued in chapter 2, this is often not an accurate representation of reality. The simplified abstract view of a complex reality is extremely useful, but the model has an inherent falsity to it. Users’ enactment that is not according to the intended workflow, such as workaround practices, is not represented in the workflow diagrams. Information attained from the activity diagrams provided data that could be corroborated with other sources of evidence. This allows the researcher to understand the structured business process, as opposed to the users’ enacted process²⁵.

Documentation is a valuable source of evidence for three reasons argued by Yin (2009). It provides information that is stable²⁶, unobtrusive²⁷ and has a broad coverage²⁸ of multiple processes and

²⁴ Activity diagrams are a Unified Modelling Language (UML) term that refers to the workflow within each business process. “Workflow means the sequencing of activities and a clear designation of who carries out each activity” (Podeswa, 2010:63).

²⁵ The collection of data through activity diagrams proved a valuable source of information for triangulation of results.

²⁶ Can be reviewed repeatedly.

²⁷ Not created as a result of the case study.

rules. These positives were drawn on and exemplified in the data analysis process. Yin (2009) addresses multiple issues and weaknesses of documentation data collection. However, due to the public nature of the organisation and its functioning in accordance with South African municipal acts, retrievability and biased selectivity were not deemed a problem. The possible problem that the original author was bias when reporting was also deemed irrelevant due to the documents being screened and signed off by both national and local governments in accordance with legislation.

3.3.1.1 *List of Documentation Provided*

The following documentation was provided or obtained for review:

- SCM Policy
- SCM ISO Business Management System Manual
- SCM Management Organisational Structure Diagram
- Local Government Municipal Structures Act
- Municipal Finance Management Act
- Preferential Procurement Policy Framework Act

Activity Diagrams:

- High-level Interaction of Process
- Procurement of Services
- Procurement of Goods
- Procurement of Goods and Services with Regard to Tenders
- Emergency Dispensations (Emergency and Urgent Purchases)
- Petty Cash Purchases
- Deviations
- Contract Price Adjustments
- Termination of Contracts
- Tender Process
- Bid Specification Management
- Verification, Validation and Scheduling
- Termination of Contracts
- Contract Price Adjustment Invoices
- Vendor Qualification

²⁸ Long span of time, many events, and many settings.

3.3.1.2 *Information Obtained*

The documentary information obtained proved to be a key component in the triangulation of data. The researcher gained valuable insight into the intended business processes defined by the LGO. The SCM policy provided the rules that are embedded in the structures of the organisation. The document provided information about the processes that need to be followed in accordance with national legislation. Activity diagrams depicted the workflow that is built into the structure of the ERP. Consequently, the researcher was able to identify the business process flow as prescribed and this proved to be a valuable source of evidence in the triangulation of data. Although interviews were the main source of data collected, the activity diagrams enabled the researcher to identify workarounds in the process that were not in accordance with the intended design. In many instances users develop routine processes that are not fully recognised by respondents in the interview process. Winter and Szulanski (2000:14) note that “informal processes used to convert early affiliates become progressively formalized”. Other authors such as Feldman and Pentland (2003) identified the nature of organisational routines.

It is due to the embedded nature of the artefact and the socio-technical dynamics produced around such a system that users can be unaware that a routine practice is performed. Workarounds can potentially become routine practices that are embedded in the functioning of the business process. Therefore the documentation obtained by means of activity diagrams and policy documents enabled the researcher to identify instances of workarounds that were contrary to the intended design. The documents also enabled the identification of threats (or risks) that a workaround can pose based on the intended policy and workflow installed. The data obtained supported the triangulation of data and was valuable during the interview process.

3.3.2 Interviews

Babbie and Mouton (2001:289) state that “a qualitative interview is an interaction between an interviewer and a respondent in which the interviewer has a general plan of inquiry, but not a specific set of questions that must be asked in particular words or in particular order”. The two researchers who conducted the study adopted this semi-structured interviewing process. The thinking behind this method of interviewing was to develop guided conversations that could be pursued in particular directions, depending on respondents’ answers. This is in accordance with to the two-level approach to interviews proposed by Yin (2009:106-107), where “case study interviews require you to operate on two levels at the same time: satisfying the needs of your line of inquiry (level 2 questions) while simultaneously putting forth ‘friendly’ and ‘nonthreatening’ questions in your open-ended interviews (level 1 questions)”.

3.3.2.1 Interview Participation

The sample population is a major element of the original design of the research study. The procurement process was the identified element of research focus in the LGO, with the main focus on the end users of the ERP. Table 2 gives a representation of the individuals interviewed and the number interviewed from each unit. The aim was to interview at least one person from each unit position in the organisation in order to obtain a representative response from every segment of the department. This was achieved to a relative degree. The methodology adopted also stated several criteria that need to be considered in selecting respondents, in accordance with the design of Spradley (1979). These included thorough enculturation²⁹, current involvement in the system and adequate time available to interview. These criteria were sort after, measured and incorporated in the selection process of the sample population. Once the relevant individuals had been identified, interviews were set up telephonically using the staff list that the organisation provided.

The managers of each unit, however, were not interviewed. The survey (conducted by the ISRG research study) results indicated that managers in the organisation tended not to use the ERP as rigorously as clerks or buyers for example. The managers simply used the system for review purposes. They did not enter data in fields on the system or other elements that are conducive to misfits or workarounds. However, if they did enact a segment in the business process, it was only to a very minimal degree. Respondents at lower levels in the organisation confirmed this in the interviews; the focus was therefore maintained on the end users in the department.

Table 2 represents the sample population breakdown. Four columns are inserted into the table. The unit column represents the section of the department that was under investigation, with the role column representing the specific employment positions that are available for that unit. The final two columns represent the number available or the posts that are filled in that role, and the achieved column represents the number of people interviewed in that role. In other words, there are six positions filled for the role of Clerk 3 in the Supplier Management division and two of the six were interviewed. The interview process resulted in 30 individuals being interviewed out of a possible 130 available. This is represented in the total column at the bottom of the table. The interview process resulted in a large portion of the sample population providing data for the research study, with a total of 23,08% of the department being interviewed.

²⁹ Respondents who were involved in the system for an extended period of time.

Table 2: Sample Interview Population Breakdown

Unit	Role	Number Available	Achieved
Supplier Management	Manager	1	0
	Head	2	1
	Clerk 3	6	2
Procurement	Manager	1	0
	Team Lead	4	3
	Buyer	29	5
	Assistant Buyer	31	5
BAC	Manager	1	0
	Professional Officer	1	1
	Clerk 3	4	1
Tenders	Manager	1	0
	SCM Practitioner	6	1
	Admin Officer 1	10	2
	Admin Officer 3	1	1
	Clerk 2	23	2
	Clerk 3	4	1
Directors	SCM & IST	2	2
SCM ERP	Team	3	3
Total:			30

3.3.2.2 *Format of Interviews*

The interviews were conducted in a semi-structured³⁰ manner. The interviewer pursued guided questions at the start and allowed the respondents to elaborate on specific focal points and areas of concerns that they felt were important. A total of 24 interviews were conducted, all of which was done at the research site. Only the interviewer and interviewee were present during the process in order to not corrupt respondents' answers with other individuals being present. Each individual being interviewed signed a form ensuring that the results would not be associated with their names and therefore allowing them to respond as truthfully and freely as possible.

The researchers recognised the shortcomings of the study from the outset. The question of biases and reflexivity³¹, as described by Yin (2009), was considered during the interview process. Although response bias was sometimes hard to eliminate, the decision was made to emphasise the point that respondents' answers were purely anonymous. It was emphasised that the interviewers were by no means tied to the organisation and were not from the Human Resources department, as

³⁰ Semi-structured "is essentially a conversation in which the interviewer establishes a general direction for the conversation and pursues specific topics raised by the respondent" (Babbie & Mouton, 2001:289).

³¹ Interviewee gives what interviewer wants to hear.

was sometimes perceived. Reflexivity was counted by allowing the respondents to engage in the conversation and guide it as they addressed certain issues of concern. The goal was to allow the respondents to “do all the talking” with certain probes being used, as described by Babbie and Mouton (2009:289). These included questions such as “How is that?”, “In what ways?” and “What would be an example of that?”. These questions allowed the interviewer to draw out answers from respondents, but not lead or guide the conversation towards the specific information that was sought after.

Interviews lasted between 15 and 60 minutes³². The integrated framework adopted in chapter 2 served as a grounded point of reference for specific questions about workarounds and business processes. Initial questions were based on the user’s perception of the system, which generally opened up avenues of concern or contentment. Further questions were posed along the semi-structured nature of the interview process as they came up in the conversation, with specific misfits or workarounds that were addressed being asked to expand on. Case protocols were followed throughout and the original design was maintained to ensure credibility and reliability of the data obtained. A point was made to follow these protocols to ensure that the data was transferable “to the extent that the findings can be applied in other contexts or with other respondents” and therefore allowing other members of the research group to use the findings and data collected (Babbie & Mouton, 2001:277).

The majority of the interviews were conducted individually to allow the respondents to give a fair and unaltered response. However, three interviews were conducted in group format; the reasons being the positions they held in the organisation and the work that the users in question performed. Although individual interviewing had its positives in extracting the issues that were prevalent in the system, it was important to have group interviews to “find information you would not otherwise be able to access. These focus groups are useful because they tend to allow a space in which people may get together and create meaning among themselves, rather than individually” (Babbie & Mouton, 2001:292). Three group interviews were therefore conducted with two to three individuals present for each session. Group interviews were kept to a higher level, where team leads or heads of departments were interviewed together. Consequently, this drew out information that constituted a greater understanding of the entire business process. “It is this shaping and reshaping of opinion that we are after [with group interviews]. We may know what each individual thinks, but once we put several individuals together in a group, we are confronted with a completely new set of data” (Babbie & Mouton, 2009:292).

³² A breakdown of the participants and duration of interviews is available in appendix A.

All interviews were recorded using a digital dictaphone to ensure that information was not lost and that it could be transcribed and coded accordingly. Yin (2009:109) proposes that “audiotapes provide a more accurate rendition of any interview than any other method”. No notes were taken or laptops open during the interviews, in accordance with protocol, in order to not distract respondents during the interview process. However, a point was made to note the most important issues that came about once the interview had been finalised. This was to discuss and analyse critical issues raised. These points were taken down on a note pad, with a conversation between researchers regarding potential areas of focus and other possible issues of concern.

The data collection was finalised with a group interview with the ERP team for the SCM department to corroborate and increase the validity of the study. This interview was important as it helped the researchers to gain a greater understanding of the socio-technical dynamics at play in the organisation. Interviews prior to this were focused on the end users of the system and the problems that they experienced. However, the last interview was designed to take the knowledge obtained and understand to what extent the ERP team was aware of the social constructs developed/developing in the organisation. These included the problems experienced and the workarounds that the researchers picked up. This interview helped to gain a more comprehensive data set as it addressed different aspects of the system and unpacked the rational as to how they deal with elements of misfit experienced as well as workarounds performed by end users.

3.3.2.3 *Transcription process*

The interview process generated a large data set from which to work that identified many avenues regarding the research question. It was important to corroborate the data obtained from the interviews with data obtained from documentation. However, before the analysis could be conducted, the audio data was transcribed. The process followed a structured approach. Transcription was conducted in a narrative format to ensure that the flow and structure of the conversation were maintained. Not all information obtained was transcribed word for word due to the irrelevance of certain conversations throughout the process. However, key points raised and relevant issues identified by the respondents were recorded in textual format. This was to ensure a clear and smooth understanding of the respondents’ answers. The completion of the transcription process provided the necessary data to conduct the analysis.

3.4 Data Analysis

The process of collecting data in raw format followed a careful design methodology to ensure credibility and reliability. The methodology used to analyse the data obtained was in line with the principles proposed by Miles and Huberman (1994) and Creswell (2009), with the emphasis being placed on the interpretation of the researcher in the context of the study. The process of data analysis “involves making sense out of text and image data. It involves preparing the data for analysis, conducting different analyses, moving deeper and deeper into understanding the data, representing the data, and making an interpretation of the larger meaning of the data” (Creswell, 2009:183). The interpretation of the data is a key component of the analysis phase in the study, and with such a large data set, it was important to focus the analysis in accordance with the problem under investigation.

The large data set required the researcher to understand the main themes that arose, the issues that the users perceived and how the respondents essentially dealt with these. The BPI framework in section 2.3.4 enabled the breakdown of these factors into analysable parts for investigation. With a research project comprising multiple lines of analysis, it is important to differentiate between what exactly the researcher is looking for from the data and what falls outside the scope of the study. The research question posed in chapter 1 helps to focus the analysis and assists in delimiting the study to a point where in-depth research can be performed. The research question posed in chapter 1 is as follows:

What is the Relationship between Business Process Integrity and Workaround Practices?

The question, along with the framework proposed, focuses the analysis on two distinct concepts. Firstly, the identified business processes defined by the SCM policy. Secondly, the workaround practices that users adopted to counter problems experienced with the system. These workarounds that users apply are the crux of the question posed. It was therefore important to focus on the misfits experienced that lead to problems encountered with the system. When these were identified, the subsequent workaround practices could be drawn out. This enabled the researcher to develop an understanding of the business processes that the system defined and how the enactment of users was contrary to the intended design³³.

In order to analyse the data, a coding technique approach was adopted. The use of codes is recognised by multiple authors in qualitative research investigations (Yin, 2009). Coding “is the process of organizing the materials into chunks or segments of text before bringing meaning to

³³ Activity diagrams of the intended business process served to identify notable workaround practices.

information” (Creswell, 2009:186). Therefore, the researcher used the concept of coding in order to prepare the interview data for analysis and interpretation.

The large amount of interview data information³⁴ was transcribed. The use of codes was therefore applied to place the data in manageable “chunks” in order to retrieve and organise the information. This is directly in line with the description provided by Miles and Huberman (1994:57) that “codes are used to retrieve and organize the chunks. The organizing part will entail some system for categorizing the various chunks, so the researcher can quickly find, pull out, and cluster the segments relating to a particular research question, hypothesis, construct or theme”.

3.4.1 Descriptive Coding

The use of descriptive codes, as explained by Miles and Huberman (1994:57), involves “attributing a class of phenomena to a segment of text”. Therefore the transcribed data can be positioned in terms of specific phenomena being identified. Descriptive codes are utilised to place different elements and phenomena into manageable chunks. However, it is important to manage the large amount of data before applying descriptive coding techniques. The information management category is presented in table 3.

The four sections of the information management category were created to manage the data in an effective and reliable manor in order to ensure that information was organised into manageable parts. The first and second sections list the unit and the role of the respondent respectively. As is seen from table 2, this is directly in line with the first two columns represented. This was to ensure that the respondents were grouped together for analysis and role interpretation. The third section represents the respondents’ names in order to not cause confusion about the information provided in each interview. The fourth section is representative of the first identifiable issues. These were taken from the note pad used to discuss the information obtained post-interview³⁵. The sections were therefore used for information management purposes and aided in the initial analyses conducted.

³⁴ A combined total of 509 minutes

³⁵ The notes that were taken and discussed between the researchers following the interview process. These notes were used to highlight main areas of concern, potential interview guidelines and immediate interpretation of the data received.

Table 3: Information Management

<i>Category</i>	<i>Sections</i>	<i>Description</i>
Information Management		
1	Unit	Unit of respondent
2	Role	Role of respondent
3	Individual	Name of respondent
4	First Identified Issues	Issues identified directly post-interview

The transcribed text needed to be organised in terms of the identified phenomena for analysis. This enabled the researcher to cluster specific segments of the data into the focus areas being targeted. The codes served as general guidelines to analyse the data transcribed. In more relative terms, this is referred to as Descriptive Codes and essentially involves little interpretation. Miles and Huberman (1994:57) state that by using this type of coding method “you are attributing a class of phenomena to a segment of text”. The Descriptive Code headings are represented in table 4.

Table 4: Descriptive Codes

<i>Category</i>	<i>Code</i>	<i>Description</i>
Descriptive Coding		
1	Misfit	Impositions or deficiencies misfit
2	Workarounds	Informal or formal workaround practices
3	Major Risks	Threats identified or interpreted
4	General Comments	Text relating to context

The four descriptive codes represented in table 4 are as follows: the first addresses “misfits” identified during the interview process, which are classified in terms of deficiencies and impositions. This allowed for elements to be extracted and placed in the columns that matched the related theory. The second code is described as “workarounds” and looked to extract segments of data that specifically related to the use of workaround practices in the organisation; both informal and formal workaround practices that were identified. The third code identifies the “risks” or threats that the respondents expressed or the researcher interpreted. In most cases respondents did not

identify an enactment as risks and consequently required the researcher's interpretation. The descriptive coding aimed to extract certain segments of text where respondents felt that a workaround was a necessity to complete the business process.

The final code is listed as "general comments" and was incorporated to include segments of text that were important to the context, but did not fit into the three aforementioned headings. The general comments section often served to link the respondents' answers to specific information that would aid the interpretation during the analysis.

It was important for the study to maintain the narratives of the respondents. In many cases, certain misfits that the users experience lead to workaround practices being performed throughout the business process. This enactment, being formal or informal, leads to certain risks (or potential benefits) to the business process. This correlated directly with the study and it was therefore essential to incorporate the flow in the descriptive coding. This approach resonates with Creswell's (2009:189) notion that a narrative is a popular way to convey the findings of an analysis, as it provides elements such as "a discussion that mentions a chronology of events, the detailed discussion of several themes or a discussion with interconnecting themes".

3.4.2 Pattern Coding

The data collected still needed to be refined further in order to obtain a well-rounded data set that enables accurate interpretation. This involved the use of pattern codes as described by Miles and Huberman (1994:57), which are "even more inferential and explanatory [than descriptive codes]. A coded segment of field notes illustrates an emergent leitmotiv or pattern that you have discerned in local events and relationships". This type of coding method was important, as it began to recognise specific elements in the text and, in doing so, allowed for detailed segments to be analysed as well as interpreted.

Creating specific pattern codes was important in the data analysis process. An original start list was created to look for specific elements that were drawn from the literature studied. The list was based on the integrated framework and the research question posed in the study. For example, when analysing elements of misfit, the column was divided into two distinct codes of impositions and deficiencies. The goal was to pick up patterns from respondents and draw out segments of text that correlated with one another. The differentiation between the impositions and deficiencies, for example, was originally done by using a colour to give a visual representation of the two elements of misfit. This was followed by using specific coded text to distinguish between specific elements of misfit (which is represented in table 4). This process was followed for all the descriptive

headings. The themes identified were important for the analysis process as well as intelligent interpretation. The use of specific coded text was to “pull together a lot of material, thus permitting analysis” (Miles & Huberman, 1994:58). The coded text allowed for easy search options of the large amount of data created.

As stated by Miles and Huberman (1994:61), “for all approaches to coding, codes will change and develop as field experience continues. Codes will change; there is more going on out there than our initial frames have dreamed of. Some codes do not work [while] other codes flourish”. The revising of codes was directly in line with Miles and Huberman’s (1994) notion of change during the analysis process. New codes were created and old ones defined or discarded throughout, until a complete data set, ready for interpretation, was formulated.

The final coding key created and used in the analysis and interpretation of the interviews is represented in table 5. The key is broken down into three distinct elements. The specific phenomena being investigated are represented in the first column. The coding column represents the coding text that was used to identify specific instances in the text. The code description is purely represented by the first word of each column³⁶. The third column represents specific instances of each phenomenon identified by respondents that occurred throughout the data set and proved to be the research’s main focus of analysis.

The research addresses three specific themes. These are the issues of misfit, the workaround practices performed and specific risks identified in the metropolitan municipality. However, it was important to characterise the specific pattern codes created in the key in table 5 with the literature already identified. For this reason, an extra column was added to identify specific theories regarding the different phenomena. This aided the analysis process to identify specific instances of workarounds according to the literature, as well as introducing new avenues regarding this form of enactment that were not fully defined. The full key code designed and adopted is represented in appendix B; this includes the theories recognised in the literature and the corresponding authors of these theories.

³⁶ For example, an Excel spreadsheet workaround was represented as WEX.

Table 5: Pattern coding Key

<i>Category</i>	<i>Code</i>	<i>Description</i>
Misfits		
	[MI]	Impositions
	[MD]	Deficiency
Workarounds		
	[WEX]	Excel spreadsheet/other software
	[WDV]	Use of dummy variables
	[WPE]	Use of phone or e-mail
	[WMT]	Mediation between individuals
	[WBS]	Bypass certain steps
	[WEM]	Emergency manual processes
	[WCR]	Changing roles
Risks/Threats		
	[RCI]	Control issues and deviations
	[RAN]	Not using agreement number
	[RNU]	Little or no understanding
	[RIS]	Incorrect service orders discarded
	[RPA]	Policies speaking against each other
Deficiencies		
	[DSP]	Information not pulling through – (Functionality)
	[DSN]	Extra steps/screens not needed – (Usability)
	[DEA]	Employee absenteeism in the line – (Functionality)
	[DNP]	Non-agreement with policy – (Control)
	[DES]	Emergency situations – (Control)
	[DDC]	Duplication of contracts – (Functionality)
Impositions		
	[IMS]	Multiple screens/steps to enter data – (Usability)
	[IHS]	Hampering service delivery time – (Control)
	[IAN]	Agreement number – (Data)
	[INF]	Not aware of functions available – (Role)
	[ICD]	Commodity differentiation – (Usability)
	[IMR]	Mass releases of contracts by managers – (Functionality)

3.4.3 BPI Dimensions

The BPI framework is crucial to the analysis of the data. The individual dimensions aided the researcher in the analysis process by analysing misfits and workarounds according to their effects on the integrity of the business process. Identified patterns occurring in the analysis could be placed in terms of the effect on BPI. As a result, the researcher could draw conclusions regarding possible relationships occurring due to the need for efficiency, effectiveness or flexibility. Consequently, the dimensions enabled an accurate interpretation of the risks/threats occurring in the process. In many instances a user deems a workaround appropriate to complete the process. The BPI dimensions

enabled the researcher to analyse this enactment in terms of the effect on the integrity of the business process.

3.5 Chapter Summary

The chapter outlines the empirical investigation conducted as part of the research study. The chapter presents a case background about the LGO investigated by means of a qualitative research approach. The background identifies LGOs in the Republic of South Africa and provides a description of what constitutes a metropolitan municipality. Following this, a review is given with regard to the functioning of LGOs and the problems that are experienced. Based on these problems and the BPI framework introduced, a case is made for the applicability of the research question posed.

Section 3 of the chapter provides a description of the data collection methods adopted in the qualitative study. The two main sources of data collected are analysed individually, namely documentation and semi-structured interviews. A list of the documentation obtained and the information provided is given. Following this, a detailed description of the interview process is given. The user participation and format of interviews are discussed. Section 4 introduces the reader to the data analysis methods adopted. This is defined in terms of specific coding techniques applied by the researcher to intelligently and accurately interpret the findings. This section analyses the descriptive and pattern coding techniques applied.

CHAPTER 4

FINDINGS AND DISCUSSION

4.1 Introduction

The empirical investigation provided the necessary data to answer the research question posed at the commencement of the study. The data analysis addressed in the previous chapter produced significant findings regarding workaround practices performed by end users of the IT artefact, herein referred to as “the ERP”. The analysis is conducted according to the integrated framework developed in chapter 2 of this thesis. The findings of the study conducted at a large LGO³⁷ will be presented and an interpretation of the results will be formulated in order to determine the relationship between workaround practices and business process integrity.

The chapter contains six main sections to outline the findings of the qualitative research study. Following the introduction, section 4.2 will introduce the workaround practices that end users of the ERP addressed. The factors identified that influence this enactment will be explained individually, followed by the identified workarounds from the data analysis process. Individual workarounds identified from the pattern coding technique are placed in individual categories. The categories are a result of literature identified in chapter 2 and the researcher’s interpretation. Once defined, each workaround category will be discussed individually with an example given of the workaround taking place. The BPI framework developed in chapter 2 is reintroduced in order to unpack the complicated and dynamic relationship between the two constructs identified. Section 4.4 will answer the research question based on the findings. Each workaround category identified is analysed in terms of the BPI dimensions developed in order to determine the threats or safeguards in terms of the hypotheses constructed. Section 4.5 applies the results to a model to provide a holistic view of the relationship between BPI and workaround practices. In doing so, identified areas of concern are depicted according to the results. The final section of the chapter constitutes a chapter summary.

³⁷ Due to the organisation’s request for anonymity, the name of the ERP provider will be withheld.

4.2 Workarounds Identified and Categorised

The fundamental contribution of this research to the field of information science is to unpack the complicated soft issues and dynamic nature of workaround practices conducted by end users. In a system that is defined by structure and rigidity, previous research has shown that users of the system find ways to workaround the intended design. According to the argument developed in the literature review, this form of enactment is a social dynamic that lacks investigation.

The data analysis and coding techniques adopted enabled the identification of workaround practices that individuals adopted in the large LGO. The investigation utilises a data set compiled by means of qualitative research and thus provides the necessary means to identify instances of the post-implementation phenomenon. The following section will present the findings on non-compliant user behaviour with the intended business process. The focus will fall on the factors influencing enactment, the misfits experienced and the workarounds performed in practice.

4.2.1 Factors Influencing Enactment

A number of factors influence the enactment of the end user of the artefact. This enactment is defined by the social dynamics developed/developing in the organisation. The section will attempt to answer the following secondary research question posed:

- what factors influence the enactment of end users of an IT artefact?

Based on the data, five influencing factors were identified. Each factor identified plays a specific role in the context of enactment, each presenting a dimension of the factors that influence workaround practices performed by end users. These factors are discussed in the paragraphs that follow.

4.2.1.1 Policy

Individuals are encouraged to know and understand the policy embedded in the organisational structures of the LGO. This understanding allows users to come to terms with why control mechanisms and business processes are designed in a specific way. An interview with the director of the SCM department indicates this:

“Enshrined in the [the ERP] system is the concept of this (the policy) and this is why the people need to understand this (the policy) before they launch a requisition.”

Policy knowledge and understanding this policy are a key element that effects the enactment of the end user. Lack of policy knowledge can prove to be a key driver in the misfits that end users of the artefact experience.

4.2.1.2 *Management*

Executive managers and heads of department have a notable influence on the way users conduct activities in the business process. Leadership principles and the values installed in the organisation effect users' willingness to adopt the structural controls that the system imposes. A manager who is committed to the structures of the system and who imposes the correct culture and values encourages users to complete processes as defined by policy. Having "buy-in" from managers is seen as a key element to the success of the system. The managers need to show commitment to the processes that the system defines, which in turn will affect the enactment of end users. The ERP team says:

"You need a committed process owner to make this thing work. That is key. [The SCM director] in this case. There are few of these in the organisation. He has a structured mind and he is dynamic but he listens to good reason and that is very important to the success of this ERP system. The buy-in is very important. We also do it with the view that we have got their trust and we have got their interest at heart always. And that is the way we go in as a collaboration."

The management buy-in and their influence on the users' enactment are a key element of success.

4.2.1.3 *Developers*

The ERP team themselves have an influence on the enactment of the users. They define the way in which the system should be run and develop the structures that ensure that the business process flows according to policy. The developers of the business process need to ensure that the design of the process not only enables the execution of activities according to policy, but has the required usability for the end user. If processes or controls developed are too rigid or structured, they can adversely affect the enactment of users. This can lead to workaround practices. However, too little control can adversely affect the organisation's ability to conduct business processes according to policy.

4.2.1.4 *External Environment*

The external environment in which the LGO functions influences user enactment, as they try to deal with the constraints imposed. Vendors and their demand requirements affect elements of the

business process such as emergency situations or changing requirements. Varying environmental factors will affect the enactment of users in the business process.

4.2.1.5 *Artefact*

The obvious key factor is the influence of the artefact on the enactment of the system. Impositions and deficiencies experienced will affect the way in which users go about their daily processing activities. These misfits have an influence on the users' enactment of the system. As recognised in the literature review, this leads to workarounds occurring to offset the problems experienced. The user's enactment of the artefact is the focus of this study. The next section will therefore introduce the workarounds identified.

4.2.2 Workaround Practices Identified

Multiple instances of workaround practices were identified during the analysis of the data. The section will attempt to answer the following secondary research question posed:

- what are the prominent types of workaround categories post-adoption?

The use of pattern coding techniques identified trends in the workaround processes of end users. The pattern coding enabled the researcher to categorise user behaviours and identify categories of workarounds performed. The categorisation process applies an interpretivist perspective³⁸ to understand such social phenomena assigned by the end users of the system and how these phenomena can be ordered for ease of interpretation.

A table is introduced post reporting to serve as a holistic overview of each category identified. A definition of the workaround category and an explanation of the specific dimensions will constitute the structure of the table. It serves as a vital cog in the research process; when compared with the BPI framework, it will look to answer the research question addressed.

³⁸ In an interpretivist study, the researcher tries to understand phenomena by examining the meaning that participants assign to them in particular social or organisational contexts (Ignatiadis & Nandhakumar, 2009:64).

A total of seven categories were identified.

- a) External Systems
- b) Data Manipulation
- c) Verbal Signature
- d) Bypass Steps
- e) Changing Roles
- f) Emergency Processes
- g) Mediation

The categories are refined from literature on workaround practices as well as the researcher's interpretation. In some instances, direct correlations could be made with the workaround literature discussed in chapter 2. However, further workaround practices were identified and incorporated to constitute the seven categories identified.

The data set, analysing individuals in the procure-to-pay process, drew out instances of misfit or misalignment in the embedded nature of the artefact. According to Strong and Volkoff (2010), the researcher identified five possible misfit domains and classified these as either impositions or deficiencies. The domains constituted are functionality, data, usability, role and control misfit³⁹. The misfits identified pointed to possible instances of workaround practices that the users of the system perform. Therefore the workaround categories addressed are triggered by an instance of misfit. Each category represents different methods, habits or techniques that end users adopt; the examples will highlight this process accordingly.

4.2.2.1 *External Systems*

The most notable workaround identified from the data is the use of software and other means external to the artefact to complete a step in a business process. This was recognised in research by Azad and King (2008). In many instances users of the system are faced with an imposition where the problem arises not from a fault in the system, but rather from the inherent characteristics of the artefact. These impositions cause users to employ alternative means to complete a process. The use of External Systems (ES) workarounds, most notably Microsoft Excel, is a popular practice that end users adopt to complete a section of the business process. Assistant Buyer (e)⁴⁰ from Procurement identifies such a workaround practice:

³⁹ The authors propose a sixth domain, namely organisational culture misfit. However, it was not deemed to affect the artefact due to its integrated and embedded nature with the structures of the organisation.

⁴⁰ Full description of roles is presented in appendix A and is represented in table 2 in Data Collection.

"We use spreadsheets. Sometimes there is too much information. You don't want to see all that; there is unnecessary information on there. Then I will do it by Excel or something like that, to make it simpler out there for other people."

The buyer addressed a functionality misfit with regard to excess information. The imposition is drawn from the completion of a task that reduces efficiency or effectiveness; an Excel spreadsheet is used to workaround the perceived difficulty. Team Lead (a) in Procurement applied the same practice:

"We only use Excel for reporting purposes. Take the information into Excel because it is a bit easier to manipulate in terms of the way you want it to read. But [the ERP] reporting is fine but sometimes you want to change it."

In many cases the use of Microsoft Excel is adopted to support the users' processes. The majority of users recognise that the functionality is available; they, however, choose not to utilise it. The next example identifies how users adopt the ES workaround for the purpose of searching for items or vendors. The artefact allows the Assistant Buyer (a) in procurement to perform the function in the process. However, her personal preference is to perform an ES workaround despite the functionality:

"When looking for vendors, who can you buy what from? And all the vendors have got listed, cleaning, chemicals etc., then you can have a spreadsheet and you can list them all nicely in there. It is on [the ERP] but I just needed to organise it for my own benefit; its fine on [the ERP], but now I can put all the vendors on my own spreadsheet. I can go to vendors and categorise them on my own spreadsheet. For me it's more comfortable. When I was buying plants, I would request a specific quotation from a vendor and they would say, 'we don't specialise in that', so I would note that and add it to my Excel. Make all the notes I need. Makes it quicker."

The user performs the Excel workaround to offset the perceived lack of efficiency in the system. She does not classify this as incorrect or askew, but rather as a necessary means to complete the section of the business process more efficiently and effectively. It enables the user to accommodate a perceived lack of effective functionality in the system. Assistant Buyer (c) from Procurement identifies a usability misfit and executes a similar workaround to complete a process. The workaround is as follows:

"I use Excel for my own purposes. I export reports and such things for my own purposes; if I need to do some editing and so forth. You can do this on [the ERP], you can make your notes on the order you can do it, but if I want to put notes in for myself to make it more efficient and

faster for me. This is instead of going back into the programme all the time. So I have it in front of me."

The workaround, triggered by an experience of misfit, leads the user to enact a practice that is an alternative to the design and structure of the system. Exporting data to Excel is seen as a workaround conducted for ease of use and functionality in the day-to-day processes. In multiple instances individuals used Excel for quick searches and readily available information to offset the imposition misfit produced by the structure of the artefact.

Impositions are a prominent trigger to execute an ES workaround. However, deficiencies in the system proved just as effective triggers in the use of ES. Users often recognise a deficiency misfit in relation to their external environment and the changing dynamics that it constitutes. Admin Office 1 (b) in Tenders experienced a deficiency misfit in terms of the ERP not being able to change formulas to accommodate changes in prices:

"Excel we basically do when, say for example the one company has approved a certain price and then we get the new increase. We put that in the spreadsheet and there is a formula we work out and then that is the increase that the company will have for a certain vehicle. Then we have to go onto [the ERP] and for each vehicle type how many vehicles and then we have to change it for all of them. [The ERP] won't allow you to do the formulas. They give you a little icon where you can do increases, this price being applicable for that month etc., but we never know when it will be applicable. But still then you need to go into each item and change it. It won't automatically pull through for all of them."

The user utilises spreadsheets to complete the business process and subsequently created a workaround practice that allows her to deal with the reduced functionality of the system. This workaround process became embedded in the social-technical nature of the system and was subsequently accepted by the end users. She states the following in relation:

"Having Excel and [the ERP] open at the same time and you go and cross-reference. So when your Excel balances, then you know, ok, these are now the right prices that needs to go in onto [the ERP]. If it doesn't balance, you know there is something wrong and you need to back and double-check. These mistakes happen a lot in a day. Fuel, today its Tuesday, so we will be preparing today for tomorrow's increase or decrease. So today we will be preparing our spreadsheets so that when the figures come in, we put it in and see if it balances. Once it balances, the person needs to load it."

In some instances users utilise the ES workaround to deal with issues of vendor certificates that are not up to date. The buyer will use Excel and conduct a manual adjudication. Buyer (c) in Procurement reiterates this workaround practice:

"The vendors' certificates, tax and BBBE etc., must be loaded on [the ERP]. If those certificates are not up to date on the day we close the quotation, [the ERP] doesn't see it. Even if it gets loaded in the meantime, [the ERP] does the check on the day the quotation is closed. Then we have to sidestep [the ERP] completely and do a manual adjudication. We have to physically put it in Excel and run formulas; we can't do it in [the ERP] at all. It's not problematic but it takes longer and all the checks must be done manually."

The type of workarounds performed using ES is extensive throughout the LGO with users viewing the enactment as a process aide. It can be argued that the workaround is executed due to perceived constraints in the system (formulas) or a lack of trust⁴¹ in the functionality of the system. The ERP team recognises the issue:

"It's just ineffective training, a maturity thing. It is effectively 'this is the way they have used it over the years and this is the way they have done it'. We are trying to move all things away, it is changing."

4.2.2.2 Data Manipulation

Data manipulation (DM) workarounds involve the end user entering dummy or mock variables in a required field in order to complete a process or a step in the process. Ignatiadis & Nandhakumar (2009) identified this type of workaround in their research. Users, by completing multiple business use cases on the system, learn to perform a DM workaround that aid them in completing tasks when faced with a data misfit problem in relation to information. The workaround practice is directly representative of what researchers term Information Integrity⁴² in the system. The user enters incorrect information in order to complete a section of the business process. Admin Officer 1 (b) from Procurement states the following:

"Say for example with IT, you can't have a fixed price, because all depending on the software because some of the software gets imported. So you can't say this is the software and this will be imported from this country and you will use this exchange rate. You have to put like, a nought rand nought cents and one day when we do use the contract, then it comes in, then we

⁴¹ Trust with the system is a construct that is beyond the scope of this thesis. Future research into the relationship of trust with the system and the enactment of technology proposed in the final chapter of this thesis.

⁴² Information Integrity is the representational faithfulness of the information to the condition or subject matter being represented by the information. Key attributes include reliability, relevance, usability, quality and value (Boritz, 2005:262).

have to go back to [the ERP] and put in the information; it doesn't just pull through. So you have to go back all the time. For other contracts, once it is loaded, it is almost like you can't go and change it. You have to delete the whole thing, then reload the same contract again. You can't just go into that item, edit it and delete it. You will delete it but you still have to reload the whole thing. Where if you save something in another programme and you don't want it anymore, it will be deleted and it will be gone and that other thing will replace it."

The DM workaround aids the end user in completing the process. She recognises explicitly that the information is incorrect or not available and, in order to complete the contract process, a dummy variable is used. The misfit is drawn from the external environment and the user executes a workaround practice that is agreed on by the social actors in the process. The concurrent approval process is applied in this situation to ensure that the "spirit" of the policy and the subsequent business process are completed accordingly. The social dynamics created around the DM workaround are important and need to be agreed on according to principle, as it has the potential to cause major problems further down the line.

Team Lead (a) in Procurement explains another DM workaround by using dummy variables:

"For our requisitions, yes. It suits our purpose because we want them to tell us what their evaluations is, or what is the maximum they are willing to spend. So we not ordering something at R50 000 when they were expecting it to come at R5 000. So where there are two fields available, an estimate and an overall limit, we put in dummy variables and it works well in our environment."

The dummy variable is used in a different context and environment to the first example. Rather than apply incorrect information to continue the process on the system, users apply false information to allow the vendor to express the maximum value to spend.

Certain respondents raised issues of individuals entering incorrect data and the problems that it causes when dealing with specific contracts. However, most of the problems addressed were not related to values and units of the exchange rate addressed above. Issues raised came mainly in the form of inaccurate information, with regard to addresses, entered in contracts. Assistant Buyer (c) recognises such problems and the subsequent frustration it causes:

"There is a delivery address on [the ERP] on the requisition but it says an address that is often the head office. You can't keep on phoning these people; must the vendor now guess where to deliver and some of the buyers, they don't even bother to check it. People don't think, and its big trucks, must that truck go to the wrong place? People are driving around like mad. Then they struggle to phone us, that driver gets an address and he goes because the purchase order said

the wrong place. What does the vendor think of us? The council is sending us an order, they don't know it should be a specific one, they just see delivery address and deliver. Get there and it's incorrect. Now I am looking like a fool. There is too much work. If [the ERP] sees there is information it accepts. It's just people, people don't think."

The respondent's answer is a clear one of irritation and annoyance with individuals entering incorrect information in a field. This is in relation to Information Integrity discussed above and can largely point to the problem of service delivery discussed in chapter 3⁴³. The DM workaround occurred prior to the enactment of the current section in the procure-to-pay process. The individuals loading or submitting requisitions have not entered the correct address in the required field, causing issues down the line. In order to bypass the required field, they simply enter the head office address. In order to complete the process, the user performs a different workaround practice to complete the process, namely a Verbal Signature workaround.

4.2.2.3 Verbal Signature

A Verbal Signature (VS) workaround is an explicit social interaction developed among end users outside the system to deal with an instance of misfit. Azad and King (2008) recognise the workaround in their work. The VS workaround is a verbal agreement to complete a process in the line. Users will need to process a requisition, but the system hinders the process due to the constraints on information. The user will then phone a head in the department and the higher-level manager will provide a verbal agreement to complete the process. Team Lead (a) in Procurement states:

"In a huge organisation like this and the bureaucracy in which we work, there are internal processes that have to be followed. In some cases we have things like deviation processes and then the order would be subsequent; you haven't received it but there would have been the necessary approval flow that would have had to be followed outside of [the ERP]."

The workaround performed is due to the environmental constraints imposed on the LGO where deviations to the general business process need to occur. The respondent recognises the formal deviation process as the order was not formally received. In order to complete the process outside the ERP, a verbal agreement is performed by someone of authority. The Admin Office 1 (a) states that:

⁴³ This will be analysed further when looking at the relationships between DM workarounds and Business Process Integrity (BPI).

"E-mail to communicate this. And yes phone a lot but I want everything on paper. They must give me their yes or no. I save e-mails etc. Attach the e-mail to the working file with the relevant information. So they can't come and say so because I need to get permission."

When information is not yet available and the process needs to be completed, individuals will use the VS workaround to fulfil the task. The workaround ensures that the efficiency of the system is maintained; however, the documentation still needs to be processed in the ERP. The Admin Officer 1 (a) states the process followed and is quick to note how control and tractability is maintained:

"Not because people haven't followed the necessary process, it is things that are unavoidable. Impractical to follow our process, so there are variations on the deviations that come in. It is not necessarily people not following the process. Going through the director covers most of that, it is an easy deterrent. We have added an extra step where you have to go via your executive director before it can come here. It goes high up so everyone can see you not doing what you are supposed to be doing in the process."

This ensures that although the workaround was performed outside the ERP, it is still in line with policy and is completed in an effective manner. The VS workaround therefore allows for a process to be completed outside the system by using a verbal approval.

4.2.2.4 *Bypass Steps*

End users of a system are often faced with usability misfits, as described by Strong and Volkoff (2010), where the task execution is either cumbersome or confusing. In most instances end users raised the issue of extra steps or screens in the process that were seen as unnecessary or irrelevant to the business process being executed. In most instances, results showed that individuals became accustomed to Bypassing Steps (BS) and thus performing a workaround practice to deal with the misfit.

Clerk 3 (a) in Supplier Management noted the following problem and enactment to deal with such a problem:

"There are some sheets on [the ERP] that we are not using so I am not sure what is the use of them being there because we just escape, escape; it is about four pages, so what is the use of them being there if we don't use it?"

The end user identified two specific points that take reference. Firstly, she is not aware of the reasons for the screens and subsequently sees no purpose for their inclusion, pointing directly at usability misfit. Secondly, she simply speaks of a collective when referring to the workaround

performed, stating “we” just escape the screens. This enactment is in line with what Azad and King (2008) refer to as concurrent approval⁴⁴ and ensures both social and collective action of the workaround practice. Another Clerk in Supplier Management, Clerk 3 (b), confirms this in a separate interview:

“There are screens that you don’t have to fill things in. Not sure about why there are the extra screens. Use it for other things ... just pass it.”

When adopting the BS workaround, end users found informal practices that aid the bypassing of errors or error messages in the system that hinder their processes. A process of learning is developed through the social dynamics and community of practice relations constructed around the system. Clerk 2 (a) in Tenders states the following:

“I’ve learnt recently how to bypass errors. You have to hit enter to get through them, I always tried clicking on OK, but that didn’t work, you have to hit enter.”

The Clerk came across issues in the system that hindered him from completing a specific segment in the business process. By using the enter key, he “learned” to apply a workaround that aids in dealing with the misfit experienced. He has in fact picked up on a deficiency in the system and performed a workaround to deal with the deficiency.

An Assistant Buyer (e) in Procurement experienced the same misfit and referred to this as “yellow error messages” that appear. She also learned, by means of a community of practice and informal enactment, to press enter as opposed to clicking ok to bypass the error message hindering her process:

“People say, but yeah the yellow comes up but you just need to enter. But why must I enter, enter, enter all the time? It is there for a reason, it is actually telling you that there is no stock to order right now, do you really want to do this requisition. If you know [the ERP] you should actually not do the requisition. Phone the store first. It is there for a reason I just don’t think people understand why.”

The Assistant Buyer (e) started to recognise the reasons behind the error and whether simply pressing the enter key to bypass the error is in line with the policy enforced and the business process designed. It is also interesting to note the utilisation of a verbal signature workaround - to phone the store where the error is occurring in order to understand and deal with the functionality misfit experienced.

⁴⁴ Concurrent Approval refers to a negotiated order among end users to perform a workaround due to collective and flexible interpretation (Azad & King, 2010:269).

4.2.2.5 Changing Roles

The question of changing roles (CR) workaround was addressed during the interview process; respondents noted problems occurring when individuals are absent. The problem of an individual missing in the line theoretically points to a break in the business process due to an obvious stop in the business flow. This problem was explicitly recognised in the LGO and noted as a formal workaround practice. In most instances, when an individual takes leave or states in advance that he or she will not be available, the appropriate measures are taken to assign the roles to an available alternative end user. The problem occurs when individuals are unable to attend work due to unforeseen circumstances. The team leads in the Procurement department recognised the issue and notes the formalised CR workaround. Team Lead (b) states:

"When someone is absent we can exchange roles; someone from another team can take over that position. That's why it is very important to work in teams. If it's a long-term absence we can request the [the ERP] guys to do a profile transfer, but if it's just for a day it is easier and less paperwork just to transfer duties to another member of the team, we can do that."

The workaround practice develops due to a control misfit in the system. The misfit is explicitly recognised by the LGO and the users of the system. According to the team lead, the formalised workaround is well structured and developed in the business processes. The team lead perceives the CR workaround to be an efficient and effective response to the control misfit experienced. Another team recognises this, but reiterates the importance of maintaining policy. Team Lead (a) in Procurement:

"It is not necessarily [the ERP] itself; the limitation is more in our environment. There are a lot of things in terms of the finance sector we work in and in terms of our national legislation to make sure that there is separation of duties. That is where it comes in because if you are not here today, it doesn't necessarily workflow to me. I don't think its [the ERP], its more that type of thing that is a hindrance. [The ERP] is just the system that you are working with."

A clerk 3 (a) in the Tenders department gave a good example of a CR workaround practice that is performed. She explained the answer in terms of buying milk for the department and needing the requisition to be signed off by the cost centre manager who is absent. She explained it as follows:

"It is a disadvantage at times, you put a requisition in and you thought the cost centre manager is coming and then that person falls sick. That is a disadvantage because there is nothing you can do. That person did not plan on being sick. She thought she was going to be at work, you process your requisition or reservation and there is nobody to approve it. If someone is going on leave you can give permission to whoever is acting to release whatever is there."

She utilises the CR workaround in relation to the misfit experienced:

"If they are not there to release you must wait, if you cannot make a plan of going to other departments or other sections to borrow some litres of milk. It is difficult in that case. It really is not good. You are the responsible person for the stock. You must find a way of getting milk for the rest of the staff on this floor. If the order is done but the cost centre manager is not there to approve. In our floor we have different cost centre managers, so you send an e-mail to the other cost centre manager to reject the requisition or reservation that I have done, I have already asked Mr so and so to approve a requisition. And you went to that manager and said, 'I previously ordered milk from so and so's cost centre but unfortunately she is not here today, so can you please do us a favour, can I order some litres of milk through your cost centre'. She approves and you go down and get it. The rules make it difficult."

She recognises the rules imposed by the system and even states that she enjoys the “culture of control and discipline” that comes with the system. This form of enactment is difficult as a result of the rules imposed by the organisation. However, due to the social constructs created in the LGO and the formalisation of the workaround, she is able to perform a role change to complete the business process.

4.2.2.6 *Emergency Processes*

In many instances certain business processes cannot be completed directly through the artefact in the desired time or due to certain constraints. The workaround is similar to Azad and King's (2008) meta-workaround. The LGO explicitly recognised this and therefore created a formal workaround practice to deal with the instance of misfit. In many instances Emergency Process (EP) workarounds are initiated on a formalised basis due to the environment and nature of the process being completed. The organisation recognises areas of constraint that require immediate attention and need to be completed outside the rigid controls and embedded structure. The VS workaround has many similarities in terms of this type of enactment; however, it is the formalised nature of the workaround that distinguishes it.

The EP workaround is performed by end users external to the system to complete a process that is needed immediately in the LGO SCM procurement line. In many instances this is based on a question of effectiveness, with the system rules hindering the process from being completed in the desired time frame. In the case of such an emergency, users of the system perform the tasks manually and return to the system at a later stage to complete the process.

Assistant Buyer (c) from Procurement states the following regarding EP workarounds and their formalisation:

"If it is an emergency we can put it under the emergency clause. We first get the job done but the clause will now cover us."

In many other instances users state that the flow of the process and the workaround practice need to be signed off by the director of Supply Chain Management in order for the completion to be aligned with policy. The use of the director was a common response to the execution of emergency manual processes and the subsequent workaround performed. The Professional Officer (a) of Tenders, a user in a higher managerial position, recognises this process and states that the director himself needs to be consulted in order to perform any such workaround:

"If it is an emergency, you will have to wait and speak to the director. He can sign a form that allows it to go through when it is needed immediately."

The EP workaround practice is recognised due to its formalised nature in the business process of the LGO. Internal documentation provided echoed this statement with a formalised business use case diagram developed for the process. In many respects the formalisation of the workaround practice and its incorporation in a formalised business process, point towards the success of the system. However, in certain instances the process causes issues down the line regarding its nature. This is indicative of what Azad and King (2008) refer to as a meta-workaround, where it governs the behaviour of other workarounds. The deviation in some instances lead to the spawning of other issues, misfits and workarounds further downstream in the system. Buyer (b) from Procurement noted the EP workaround practice but raised the issue of problems and workarounds developing once the information is submitted to the artefact according to the business process. He provides an example related to a construction repair work emergency:

"Some of the guys will have the decency to send you a courtesy e-mail and say we've had a breakdown of sorts and gone on to get the repair work done. Other times they'll just send you the documentation the next day or later and say it was an emergency. I look at it and sometimes confirm it with their director. I'll ask him to just check it for me and make sure all is in order before processing it. Sometimes the guy will forget about it and only remember he had a repair done when the vendor's invoice comes through to him. Then he'll put in the requisition - the job was done - even though it's in the past. The guys can steal money this way if they want to, I mean [the ERP] won't know, I won't know. I'm not saying it happens, but it can happen. If it's a low amount, like R2000 or R3000, I'll just put it through and change the dates."

The issue raised by the Buyer is noteworthy, as it points to issues that essentially affect the business process and its subsequent integrity further down the line. In many instances he states how individuals forget to submit requisitions and having to submit this only at a later stage. The most striking issue raised was in relation to how individuals are able to workaroud the system in order to initiate an illegal act, in this case theft. This issue will be raised in section 4.4 of the analysis. In many instances of such workarounds, end users are forced to perform a mediation role in order to complete a process; it is often indicative of workarounds developing further down the line, as discussed. In the example presented above, the buyer is forced to execute such a workaround and therefore introduces the final workaround practice identified, namely mediation.

4.2.2.7 *Mediation*

In most instances the Mediation (ME) workaround is adopted to offset an instance of misfit with the system. A user performs the workaround due to an issue experienced in the system in order to complete the process. The use of phone, e-mail or walking around is a common enactment. Admin Officer 1 (a) again states how internal workarounds of such a nature are performed:

"At the buyers section there was a girl coming this morning to say when we loaded a contract, they have got different items. For example one will be your heading and below will be your sub-items. 1.1, 1.2, but sometimes they cannot see it ... when we go into [the ERP] from our side, we can see that the contract is loaded but they cannot see because it doesn't pull through. From my side I can see the contract is loaded and I cannot load it double. They walk to me and ask me."

This ME workaround is performed to offset the functionality misfit of the system not pulling through the correct data. In order to deal with the deficiency that the user experiences down the line, the individual will perform a verbal workaround and a social enactment to complete the process. She obtains the required knowledge in order to complete the process. Users also perform workarounds for efficiency purposes to ensure the completion of the Business Process in the required time. In some instances the enactment is related to a relationship-building construct in order to maintain efficiency and effectiveness with the vendor. Buyer (d) says:

"Because IT has such a high flow of requisitions coming in, I sometime just, on an e-mail ... I drop them an e-mail and say 'this requisition, insufficient info, please correct, please rectify. So you don't reject, you build up a [relationship] because it saves. Sometimes the person that created it isn't there, so the other person wouldn't know. There are certain times when you say, 'reject it'. I will actually pick up a phone for instance and say look, I can't create because there is no info; please, can you see that it is there. They get a move on and I do my work."

The buyer went further to show how he utilised the workaround to aid individuals in completing the process before he received it further down the procurement line:

“I didn’t get training in how to create a requisition. Even though at one stage I had a screen dump of what they see and where to start and that is what I use to help people. I mean I don’t know how to do it, but here is an example of how to do it. And help them figure out, they know which buttons to press. It helped but it shouldn’t be that way because just like they expect us to know how to do our jobs, they should know how to do theirs.”

The ME workaround is therefore performed to deal with issues related to the system further down the line. The use of phone, e-mail or walking around to offset the problem experienced is a workaround recognised by members in the line and is enacted on a regular basis.

4.2.3 Workaround Practices Categorised

Identifying specific instances of workarounds practices and analysing the social constructs developing around these enactments are central to the research study conducted. As can be seen from the practices identified above, a workaround is triggered by an instance of misfit encountered. This enactment is by and large based on interpretative flexibility and in most cases a social approval that is deemed necessary to complete the defined business process. Individuals often apply the same workaround practice (for example, the use of an ES workaround such as Microsoft Excel), but in a multitude of different ways and for different misfits experienced. These different enactments provide a good contrast on which to base the categories or abstract representations of reality into defined phenomena.

With the workaround categories identified from the data and multiple workarounds defined, a holistic representation can now be crafted. Table 6 provides a list of the workarounds identified and includes a refined definition of what constitutes the specific workaround category. The definition is an amalgamation of the researchers’ interpretation of the findings and published literature on the topic. The column presented on the right-hand side of the table signifies an overview of the specific workarounds identified throughout the data. The categories created and the subsequent dimensions identified provide a base on which to analyse the socio-technical dynamics of workaround practices. Using these findings from the LGO, we can determine the relationship with the BPI framework proposed and ultimately produce a verdict on the effect they have on integrity.

Table 6: Workaround Categories

Workaround Categories		
<i>Category</i>	<i>Definition</i>	<i>Workaround Practices</i>
External System (ES)	“The process of using systems external to the artefact to complete a process. Involves the manipulation of data external to the system when carrying out processes”	ES ¹ – Exporting data to Microsoft Excel for ease of use ES ² – The use of Microsoft Excel to shorten input process ES ³ – The use of Microsoft Word ES ⁴ – The use of pen and paper
Data Manipulation (DM)	“The artefact constrains the user to input a value in a relevant field in order to continue with the process. Fictitious data is entered to ensure this continuation. It also involves the entering of data that is known to change or become inaccurate”	DM ¹ – Entering data that does not accurately reflect actual events DM ² – Entering mock variables to continue with the process when the variable is known to change
Verbal Signature (VS)	“The use of phone, e-mail or other means to complete a process. It is a social approval among actors to complete a step in the business process. The verbal workaround practice involves explicit social interaction”	VS ¹ – Using phone or e-mail to complete steps in the system when a deficiency or imposition occurs VS ² – Using a phone to pass a step. That is, calling a person of authority to initiate a step or complete a process
Bypass Steps (BS)	“Also referred to as non-use of the system and involves the bypassing of certain steps or skipping/omitting screens in the process. Involves instances of manual or informal bypassing of the defined structure”	BS ¹ – Skipping screens in the process due to not understanding their purpose or not needing to complete BS ² – Recognition that using the enter key will bypass a step as opposed to clicking for continuation BS ³ – Bypass by manual process
Changing Roles (CR)	“In many instances individuals perform a role change to complete a process due to absenteeism. The rigid control of the system prevents the intended user from completing the process without enacting the change”	CR ¹ – Changing roles to complete a process CR ² – A manager or supervisor completing a process
Emergency Processes (EP)	“This can be referred to as an essential and formal workaround practice. It was explicitly built into the business processes; however, it is outside the artefact. It involves completing an emergency task through manual processes bypassing the system entirely”	EP ¹ – A process signed off by a manager or a head of department EP ² – Manually completing a process under emergency EP ³ – Completing a process external first and later entering the correct information on system
Mediation (ME)	“Involves individuals asking others for assistance when a lack of understanding or confusion forms around a process. It forms a community of practice around the processes of the system”	ME ¹ – Individuals asking others to assist due to lack of understanding and training ME ² – Individuals asking others for help to complete a process

Table 6 provides the necessary constructs to answer the research question of this thesis. In order to analyse the workaround categories in terms of the BPI framework, it is useful to briefly revisit the proposed framework.

4.3 BPI Framework Revisited

The integrated framework identifies specific dimensions associated with BPI. These dimensions are represented in table 7. Each dimension is represented in the column on the left with a definition provided for each construct in the middle. The row on the right, referred to as WA explanation, provides the theoretical hypotheses that were developed prior to the research being conducted. These hypotheses are based on the literature and interpretation of the researcher to gain understanding of the proposed effects of workaround practices on BPI.

As is stated in the development of the framework, the dimensions are created to provide a theoretical foundation for studying BPI in relation to large IT artefacts. The framework is not designed for public sector organisations specific, but is rather generic in the sense that its application can apply to alternative organisations. By analysing each dimension individually, a holistic view of BPI is fashioned. This will aid in the identification of threats or safeguards⁴⁵ to the BPI of the organisation.

The BPI dimensions developed in table 7 and the Workarounds Categories reported on in table 6 provide the backdrop to the possible relationships developing between the two paradigms, and ultimately answer the research question. The next section will analyse each workaround practice identified in terms of its influence on the BPI dimension developed.

⁴⁵ Threats and Safeguards pointing to the two hypotheses of the research question.

Table 7: BPI Framework Revisited

BPI Dimensions		
<i>Dimension</i>	<i>Definition</i>	<i>WA Explanation</i>
Efficiency (EFI)	“Reducing cost and cycle time, increasing productivity process and improving quality and service”	EFI ¹ – Decrease output of procedures EFI ² – Increase cost of procedures EFI ³ – Increase amount of rework for data entry EFI ⁴ – Increased time to complete a given task
Effectiveness (EFE)	“Improving decision-making, planning, resource management and delivery. Increased functionality, enhanced quality of users’ work, access to data and information, high-level data integration, data forecasts and improved quality of operations”	EFE ¹ – Decrease value to operations EFE ² – Decrease access to correct data and information EFE ³ – Decrease high-level data and information integration EFE ⁴ – Decrease functionality to meet requirements EFE ⁵ – Decrease quality and service delivery
Flexibility (FXI)	“More flexibility in response to changing business requirements or environments”	FXI ¹ – Decrease ways to customise processes FXI ² – Decrease agility of organisation FXI ³ – Decrease adaptability to changing business environment/ requirements FXI ⁴ – Decrease extensibility of operations
Policy Adherence (PAD)	“Fair, equitable, competitive and cost-effective system and minimises fraud, corruption, favouritism as well as unfair and irregular practice”	PAD ¹ – Decrease use of policy processes PAD ² – Increase corruption or fraud PAD ³ – Decrease in competitiveness PAD ⁴ – Increase in unauthorised or irregular expenditure
Traceability (TRC)	“Acceptable internal controls to ensure that end users comply with rules and legislation of the LGO and monitoring performance in the process”	TRC ¹ – Decrease accountability TRC ² – Decrease system of control TRC ³ – Increase corruption or fraud TRC ⁴ – Decrease information and data of services TRC ⁵ – Increase in unauthorised or irregular expenditure
<i>Process (Operational) Integrity (PIT)</i>	“Ensuring that the business process does not affect end users’ operational capacity at later stages in the process conducted”	PIT ¹ – Decrease in process later down the line
<i>Information (Data) Integrity</i>	“Ensuring that the business process does not affect end users’ operational capacity at later stages in the process conducted”	II ¹ – Decrease in the information retrieved from the system

4.4 Workarounds and Relationship with Business Process Integrity

The influence of workaround practices on specific BPI dimension categories relies on both the interpretive judgement of the researcher and the interpretation of the respondents. In social research of such a nature, the researcher relies on the interpretation of the respondents to a specific social construct and the result thereof. The researcher is aware of the issues and biases that come with an interpretivist approach and recognised the limitations thereof. As noted by Miles and Huberman (1994:8), “researchers are no more ‘detached’ from their objects of study than are their informants. Researchers have their own understandings, their own convictions, their own conceptual orientations; they, too, are members of a particular culture at a specific historical moment. Also they will be undeniably affected by what they hear and observe in the field, often in unnoticed ways”.

Recognising the role of individuals’ frames of reference is an important element of the study, as users’ beliefs and perceptions influence the way they enact artefacts (Weick, 1995; Le Roux & Le Roux, 2010). The researcher will therefore look to draw conclusions based on people’s meanings developed towards events, processes and structure, as well as how they connect these meanings to the social world around them. This connection and the informed interpretation of the social construct that end users enact (namely workarounds) will enable the primary research question to be answered by testing the hypotheses developed and gauge to what extent the assumptions hold true. It is beneficial to revisit the primary research question at this stage:

What is the relationship between business process integrity and workaround practices?

The hypotheses originally developed in the introductory chapter of this thesis are directed at two distinct parallels in terms of the relationship between workarounds and BPI. The hypotheses originally developed are:

- 1) workaround practices that end users of ERPs enact pose a *threat* to business process integrity in organisations; and
- 2) workaround practices that end users of ERPs enact serve as a *safeguard* for business process integrity in organisations.

Of the seven workaround categories identified, each can be analysed in terms of the BPI framework developed. In other words, each category will have an influence on some, if not all, of the dimensions and thus will determine the relationship between the two phenomena. A simple acknowledgement is that certain workaround categories will not affect specific dimensions. However, these results still need to be reported, as the findings play a role in the influence of the

overall relationship with BPI. The following section will therefore identify the influence of each workaround category on the individual BPI dimensions in the framework. The results will then be incorporated in the Business Process Workaround (BPW) matrix to highlight the potential areas of threat and where it is a safeguard according to the hypotheses.

4.4.1 Workarounds Using External Systems (ES)

The ES workaround involves the process of using systems external to the artefact to complete a process. It involves the manipulation of data external to the system when carrying out the processes. The ES workaround will be analysed in terms of the BPI dimensions in order to determine their relationship.

4.4.1.1 *Efficiency*

The ES workaround is most commonly performed to offset a perceived imposition in the artefact. In other words, the inherent characteristics cause misfits to arise in the Business Process (BP). Impositions can often be described as hindering efficiency of the BP, as they limit the user in executing his or her tasks in the least available time and therefore affect the output. The utilisation of the ES workaround through Excel spreadsheets is believed to increase the system's efficiency for the user. This enactment works on the premise that the use of an ES will decrease the input to output conversion ratio. The workaround therefore increases the output of procedures as a user is able to manage data more efficiently.

In many instances the workaround, due to the imposition experienced, is performed with the knowledge that the functionality *is* available to complete the task. Users are often more conformable with external systems such as Excel. Assistant Buyer (a) states that:

"You can do this in [the ERP], you can make your notes on the order. You can do it. But if I want to put notes in for myself to make it more efficient and faster for me."

The user therefore exports the information to Excel and utilises the workaround based on perceived efficiency. Assistant Buyer (c) makes the same case when searching for a vendor:

"It is on [the ERP] but I just need to organise it for my own benefit, its fine on [the ERP], but now I can put all the vendors on my own spreadsheet. Make all the notes I need. Makes it quicker."

The usability misfit and the subsequent imposition cause users to utilise an ES workaround to increase the efficiency dimension of the BP. It can be argued that there is a lack of trust in the

system. Users are aware of the structures and understand that it is available to them in the ERP. However, they choose to perform an ES workaround in the external software due to personal preference.

The ES workaround therefore has a positive relationship with efficiency in terms of the BP and the BPO for the user. It allows the user to be more efficient in terms of actions completed in the work flow. This workaround therefore points to a positive relationship with the hypothesis of a *safeguard* and has a high impact on this dimension.

4.4.1.2 *Effectiveness*

End users make use of the ES workaround in relation to misfits experienced in the system to complete a BP more effectively. In most cases identified, the deficiency pointed towards a functionality misfit with Excel spreadsheets utilised to offset the problems experienced. These problems related to the ERP not being able to input formulas to complete a price change. Admin Officer 1 (b) explains:

"[the ERP] won't allow you to do formulas. They give you a little icon where you can do increases".

Users perform an ES workaround by exporting the data from the ERP and inserting the required formulas. The information is then re-inserted into the system. It allows for the user to overcome the deficiency experienced and complete the process in an effective manner.

The user performing an ES workaround has a positive influence on the effectiveness of the tasks completed. However, when analysing the overall effect of the BP, it can have a negative relationship with effectiveness. If individuals export data to an Excel spreadsheet, it influences the integrity of the information. Information Integrity is affected when the BP has a negative effect on end users' operational capacity further down the line. This can result from the formulas created being incorrect in the Excel spreadsheet or information changing in the system that affects the data that is exported.

Members of the ERP team recognised the issues regarding the effectiveness of the procure-to-pay line were during an interview. They state:

"Like a manufacturing department where a unit goes through five or six different chains. If something doesn't work at one part the whole thing gets backed up and there is a bottle neck, a Silo Effect."

The utilisation of the ES workaround to complete a task is efficient for the user; however, it can have a negative effect further down the line. Excel formulas used in the external Excel spreadsheet may be incorrect or misrepresented, causing inaccurate data being re-entered in the system.

The ES workaround, although having a positive relationship with the effectiveness of the end user, poses a major risk in terms of the integrity of the BP. Information quality, accuracy and value are jeopardised with the utilisation of the ES workaround. It therefore poses a *threat* to BPI.

4.4.1.3 Flexibility

The ES workaround is utilised to deal with an imposition or deficiency of the system. In the cases presented above, individuals either used Excel for efficiency purposes or to workaround the issue of formulas. Performing the workaround does not adversely influence the ability of the LGO to adapt to changing environments.

In some instances the ES workaround is performed to bypass the perceived inflexibility of the system, with users adopting the workaround in order to gain a level of flexibility. Buyer (c) states that:

"The vendors' certificates, tax and BBBE etc., must be loaded on [the ERP]. If those certificates are not up to date on the day we close the quotation [the ERP] doesn't see it. Even if it gets loaded in the meantime, [the ERP] does the check on the day the quotation is closed. Then we have to sidestep [the ERP] completely and do a manual adjudication. We have to physically put it in Excel and run formulas; we can't do it in [the ERP] at all."

The ES workaround is therefore performed to increase the flexibility dimension in the BP in order to insert the correct information into the system and uphold effectiveness.

The utilisation of the ES workaround does not affect the LGO's ability to adapt to changing environments. Users perform an ES workaround due to a lack of trust in the ERP and being more comfortable with the external technology. However, the enactment can affect the flexibility of the BP in a positive manner and allow for processes to be completed that would have caused bottle necks. The enactment therefore acts as a *safeguard* to the flexibility dimension in terms of BP.

4.4.1.4 Policy Adherence

The execution of the ES workaround has a negative effect on the policy adherence dimension of the BP. As defined by the Auditor-General of South Africa (2012:63), "to ensure fair, equitable, transparent, competitive and cost-effective SCM system, the process and controls need to comply

with legislation and must minimise the likelihood of fraud, corruption, favouritism as well as unfair or irregular practice”. In terms of the ES workaround, exporting data to Excel in order to complete a process poses a risk to these measures with information being processed outside the system of control. The completion of the BP will generally comply with the policy ingrained in the structures of the system; however, the extraction of information poses a risk to the dimension. As identified, irregular expenditure in SCM of municipalities in South Africa results in R6.7 billion due to contravention of policy (Auditor-General, 2012:63). The ES workaround and the extraction of data can have an influence on this outcome due to its external nature.

The ES workaround therefore poses a major risk to policy adherence and the integrity of the BP. Incorrect information being re-inserted into the system from errors made in using external systems poses a *threat* to the policy adherence dimension.

4.4.1.5 *Traceability*

The ES workaround, due to its enactment external to the system, poses a major risk to the organisation in terms of traceability. Conducting a BP in the confines of the system allows the LGO to track information processing along the flow line. The extraction of data to ES causes a lack of traceability with regard to where problems occur. Incorrect formulas used in Excel can have major effects down the line of the BP in terms of effectiveness and output. Irregular expenditure and the increase cost incurred from this enactment can become a major problem; the inability to trace the issues in the system causes a major hindrance to the integrity of the BP.

The utilisation of an ES workaround therefore poses a risk to the integrity of the BP. Information being extracted from the system therefore poses a *threat to* traceability in BPI.

4.4.2 Workarounds in Data Manipulation (DM)

The DM workaround occurs when the artefact constrains the user to input a value in a relevant field in order to continue with the process. Fictitious data is entered to ensure this continuation. It also involves the entering of data that is known to change or become inaccurate due to environmental constraints. The DM workaround will be analysed in terms of the BPI dimensions to determine their relationship.

4.4.2.1 *Efficiency*

End users specifically perform the DM workaround for efficiency purposes. Fictitious data is entered to continue with a process and produce an output in the least available cost and time. In some instances the workaround is applied due to constraints in the environment, according to the

example of changing exchange rates when buying goods abroad. Individuals enter incorrect data in a field, such as a zero, to complete the process in an efficient manner. The end user therefore perceives this as increasing output in the least available time. The misfit is related to a specific environmental constraint that the end user experiences; the workaround increases the efficiency of the BP at that specific time in order to complete the process.

The efficiency of this workaround also needs to be analysed in terms of rework required to complete the process once the correct information is obtained. Admin Officer 1 (b) recognises this hindrance to efficiency after entering dummy variables to complete the process:

“You have to go back all the time. It is almost like you can’t go and change it. You have to delete the whole thing, and then reload the same contract again. You can’t go into the item, edit it and delete it. You will delete it but you still have to reload the whole thing.”

Therefore users perform the DM workaround to overcome a constraint imposed by the environment by entering dummy variables. However, the enactment causes a major decrease in efficiency once the correct information is obtained as well as issues further down the procurement line.

The DM workaround therefore has a short-term relationship with the efficiency of the BP. However, there is a strong negative relationship with regard to the long-term efficiency dimension of the BP and the BPO. Output, speed and productivity are all affected by the issue of having to reload contracts on the system and to perform rework in the task. This workaround therefore holds a high risk in terms of the BPI dimension and poses a *threat* to the integrity of the BP.

4.4.2.2 *Effectiveness*

The DM workaround has an immediate effect on the effectiveness of the BP. In many instances the misfit arises due to individuals not having access to the correct information required to complete a process in a field. As has been seen, the enactment is conducted to increase efficiency in the short-term, and in most instances this is a necessary enactment. However, this enactment (although perceived as necessary due to the constraints imposed) has a negative influence on the effectiveness of the BP. Inaccurate information entered in the system is in direct correlation to the definition of effectiveness in terms of having better access to complete and correct data. The workaround has a negative effect on Information Integrity, and the accuracy of the data is impaired. There is a decrease in the quality of information produced, as the system now processes incorrect data.

An issue that Assistant Buyer (c) raised addresses an effectiveness issue regarding the utilisation of a DM workaround. She states that:

“There is a delivery address on [the ERP] on the requisition but it says an address that is often the head office. The vendor must now guess where to deliver and some of the buyers don’t even bother to check. If [the ERP] sees there is information it accepts. It’s just people, people don’t think.”

Individuals enter the incorrect address due to not having the correct information or simply for the sake of completing the field; it causes major problems down the procurement line. Efficiency is hindered due to the information entered in the field not being accurate, which results in a loss of integrity in the BP and specifically the BPO.

The DM workaround therefore produces a negative relationship with BPI in terms of the effectiveness dimension. It causes bottlenecks further down the line as users process information based on the assumption that it is correct. The rework of data to establish the correct information also decreases value to the organisation. A loss of customer base is also incurred as vendors move business away from the LGO due to costs incurred by incorrect information provided (such as delivering to the incorrect address). The workaround, although necessary in some instances, poses a risk to the integrity of the BP and therefore poses a *threat* in terms of BPI.

4.4.2.3 *Flexibility*

A user performing a DM workaround has a direct correlation to flexibility. Users perform such a workaround due to the control mechanism that the system enforces. Flexibility relates to the BP being able to adapt to changing contexts and, in doing so, producing an effective outcome. Users gain knowledge of these constraints and in order to be flexible in their daily processes, use the workaround to maintain the integrity of the BP, in this case efficiency. Changing fuel prices and exchange rates point directly to the type of environmental constraints that the LGO faces. In order to counter these potential hindrances to workflow and output, the flexibility of the workaround enables them to complete the process.

The DM workaround therefore has a positive relationship with the flexibility dimension and serves as a *safeguard* to the BPI and BPO. The agility of the BP is maintained through this enactment.

4.4.2.4 *Policy Adherence*

The DM workaround does not have a direct correlation with policy adherence, although it does inadvertently affect it. Processes are still followed according to the intended design of the workflow of the system, with activities still being completed as intended. However, incorrect information inserted in a field and the subsequent effect on Information Integrity can potentially lead to irregular

practice. This can be argued in terms of the resultant outcome that the workaround has in the procurement line. Manipulation of data in the processes is not according to the rules enforced by the policy and can hinder the integrity of the BP. However, in terms of the environmental constraints encountered and the need for flexibility, the policy principles are maintained when the correct information is re-entered in the system. There is a concurrent approval (Azad & King, 2008) that allows the workaround to adhere to the policy enshrined in the system.

The DM workaround does not affect the letter of the policy. It is enacted to deal with the constraints of the environment imposed on the LGO and is conducted in the structures of the system.

4.4.2.5 *Traceability*

As with the case of the policy adherence dimension, the traceability of the DM workaround does not affect this dimension directly. The workaround involves an enactment that is internal to the system and does not involve going out of the system to complete the process. A level of control is maintained and, although not formalised, the limitations in the environment allow for a social approval in accordance with the BP.

The traceability dimension therefore does not influence the integrity of the BP. Its enactment has large effects on other dimensions in the BP; however, traceability is maintained due to the internal nature of the workaround.

4.4.3 Workarounds by Verbal Signature (VS)

The VS workaround involves the use of phone, e-mail or other means to complete a process. It is a social approval among actors to complete a step in the BP. The verbal workaround practice involves explicit social interaction. The VS workaround will be analysed in terms of the BPI dimensions in order to determine their relationship.

4.4.3.1 *Efficiency*

The VS workaround is utilised to complete a section of the BP by verbal agreement. There is a concurrent approval that acts as a meta-workaround. The director or high-level manager will give a verbal agreement to complete a section in the process. This enactment is due to the constraints imposed on the LGO in its environment. The VS workaround therefore allows for end user to complete a section in an efficient manner. The increase in output and speed of delivery in the LGO is maintained by gaining a verbal agreement to complete the process. Admin Officer 1 (a) states that:

“Not because people haven’t followed the necessary process, it is things that are unavoidable.”

The workaround is associated with Azad and Kings’ (2008) concurrent approval. In their case the enactment was to dispense medicine when it was required without following the policy to the letter. The same applies to the VS workaround performed at the LGO. The Admin Officer states:

“It is impractical to follow our processes [in certain situations], so there are variations on the deviations that come in.”

This increases the efficiency of the system and maintains the level of output and speed of the process required.

The utilisation of a VS workaround has a positive relationship with the efficiency dimension in the BPI. It enables users to complete a task by using a verbal agreement with the director or manger. The VS workaround therefore acts as a *safeguard* to the efficiency of the BP.

4.4.3.2 *Effectiveness*

The VS workaround is performed to increase the efficiency of the organisation in terms of creating the needed level of output in accordance with the required BP. The verbal agreement allows for a constraint to be dealt with in terms of the limitations of the LGO’s environment. The control measures that the system enforces can hinder the effectiveness of the BP where an unavoidable situation arises. To ensure the effectiveness of the process dealing with the constraints imposed on the LGO, a deviation was enforced that allows the user to perform a process outside the system. The workaround needs to be authorised by the director of SCM to be completed and therefore maintains quality and accuracy in the process. Value to the output of operations is maintained and the procurement of goods and services is produced in accordance with the intended policy enforced.

The VS workaround has a positive relationship with the effectiveness dimension of the BP and therefore acts as a *safeguard* to the integrity. The director is aware of the deviation and it can be processed on the authority of a high-level managerial decision. The only hindrance to the effectiveness of such a workaround relates to the director not being able to process the request. If the director or a high-level manager is not available to execute a verbal agreement in the BP, this can decrease the effectiveness of the procurement line.

4.4.3.3 *Flexibility*

The flexibility of the BP is a key a component of this workaround. The LGO recognised the need to adapt to changing environments and have a certain level of flexibility in order to be efficient. The

flexibility of the workaround is an important element in the success of the organisation and had a direct influence on the structure of the process. Team Lead (a) states:

“We have added an extra step where you have to go via your executive director before it can come here”,

It indicates that the LGO recognised the need for the process to be flexible in order to ensure integrity; the necessary structures were included to ensure this effectiveness.

The flexibility that the VS workaround creates has a positive influence on the integrity of the BP. It is a key driver of the success of the system and allowed for the effectiveness and efficiency of the process to be maintained. Without the effectiveness of this workaround, bottlenecks would occur in the procurement line that would adversely affect the integrity of the process. It is therefore a *safeguard* to the needed flexibility of the BP.

4.4.3.4 Policy Adherence

The VS workaround is performed for efficiency and effectiveness purposes in order to complete a section in the BP. The concurrent approval process aids the alignment of the workaround with the necessary processes and allows the LGO to deal with the constraints that the environment imposes. The workaround does not follow the letter of the policy, but rather is enacted in what Azad and King (2008) refer to as the “spirit” of the policy. Admin Officer 1 (a) expresses this perfectly in her explanation of the VS workaround:

“Impractical to follow our process, so there are variations on the deviations that come in. It is not necessarily people not following the process. Going through the director covers most of that, it is an easy deterrent. We have added an extra step where you have to go via your executive director before it can come here. It goes high up so everyone can see you not doing what you are supposed to be doing in the process.”

The LGO therefore recognised the constraint imposed and added steps to the process that allow for the enactment, but ensure that it is in the dimensions of the policy. This enactment, although informal, meets the requirements of the policy in the organisation and is a major factor for the success of the workaround and BP.

The VS workaround has a positive relationship with the policy dimension in the BPI. Although not enacted to the letter of the policy, the governance and leadership that the directors and managers express ensure its alignment with the policy. This management of the constraints imposed is a key driver to the success of the BP and is therefore a *safeguard* to the integrity of the BP.

4.4.3.5 Traceability

The major risk to the integrity of the BP in terms of the VS workaround is that of tractability. Due to the nature of the workaround external to the system, the integrity of the tractability dimension is hindered. Individuals use the BP workaround and complete the process with a verbal agreement. However, the enactment has an adverse effect on the Information Integrity of the system.

Some users tried to counter the lack of traceability to ensure that their actions are covered in the policy. This indicates a culture of policy adherence in the LGO. Admin Officers state that the necessary means are enacted to ensure a level of traceability:

“E-mail to communicate this. And yes, phone a lot but I want everything on paper. They must give me their yes or no. I save e-mails etc. Attach the e-mail to the working file with the relevant information. So they can’t come and say so because I need to get permission.”

This is positive with regard counteracting the negative effect on the traceability dimension; however, the use of phone and verbal agreements is often impossible to accurately record in the process.

The VS workaround therefore has a negative relationship with the integrity of traceability in the BPI. There is a risk of processes being inaccurately expressed due to the enactment being external to the system. The workaround therefore poses a *threat* to the integrity of traceability in the BP.

4.4.4 Workarounds by Bypassing Steps (BS)

The BS workaround is also referred to as non-use of the system and involves the bypassing of certain steps or skipping/omitting screens in the process. These include instances of manual or informal bypassing of the defined structure. The BS workaround will be analysed in terms of the BPI dimensions to determine their relationship.

4.4.4.1 Efficiency

Individuals utilise a BS workaround due to perceived deficiency misfits experienced in the defined BP of the system. The workaround is performed for efficiency purposes in the BPI. Individuals are faced with a step (screen) in the process that is either cumbersome or confusing and is therefore subsequently omitted. A usability misfit is therefore identified as a trigger to the workaround practice and is enacted to increase output, decrease time and ensure productivity. These factors all point towards a positive relationship between the BS workaround and the efficiency dimension for the user.

In most cases identified from the data gathered, users are unaware of the reasons for the extra defined steps. Clerk 3 (b) states that:

“There are screens that you don’t have to fill things in. Not sure about why there are extra screens. Use it for other things. Just pass it.”

The enactment is based on a lack of understanding and alleged insight that the screens simply have no purpose. In all of the cases identified regarding the omitting of screens and utilisation of the BP workaround, individuals did not state that these caused problems in terms of output further down the line. Some indicated that it is a lack of understanding, as Clerk 3 (b) indicates:

“Not everyone is educated about the system or as educated as they should be.”

There is a general lack of understanding among end users of the overall BP and the dynamics at play that will affect other dimensions in relation to the BP workaround.

In terms of efficiency, the BP workaround has a positive relationship with BPI. According to the findings of the data, this enactment did not adversely affect the BP, but rather increased the efficiency of the task completed. It is therefore a *safeguard* in terms of the efficiency dimension of the BPI.

4.4.4.2 Effectiveness

Bypassing certain steps in the system has a negative influence on the effectiveness dimension of the BP. In many instances, as identified above, users perform a BS workaround to bypass certain steps in the system that are seen as cumbersome or irrelevant. They impede the user from completing the steps in the process, with most indicating that there must be a reason; however, there is a lack of knowledge as to what that reason is. In some instances, users are faced with error messages that occur on completing a task. The system bases these messages on the severity of the error received. Users perform a BS workaround to bypass the errors when recorded in order to complete the process. This indeed makes them more efficient in terms of output and therefore efficiency; however, it hampers effectiveness. Clerk 2 (a) states:

“I’ve learnt recently how to bypass errors. You have to hit enter to get through them. I always tried clicking on OK, but that didn’t work; you have to hit enter.”

The enactment indicates a workaround practice that was adopted by recognising a deficiency in the system. Users are able to bypass error steps that are hard coded into the system. These errors attempt to prevent individuals from completing tasks that are inaccurate or against policy. This BS

workaround has an obviously negative relationship with policy adherence. The error messages are incurred for a reason. Assistant Buyer (e) states:

“People say the yellow [error message] comes up and you just need to enter. But why must I enter, enter, enter all the time? It is there for a reason, it is actually telling you that there is no stock to order right now, do you really want to do this requisition. If you know [the ERP] you should actually not do the requisition.”

The BS workaround of using enter to bypass the system is there for effecting the integrity of the effectiveness dimension in the BP.

There is a negative relationship between the BS workaround and the effectiveness of the BP. Error messages received are bypassed, which leads to bottlenecks further down the line. This therefore has an adverse effect on the ability to complete a task and has a high risk in terms of BPI, leading to issues such as service delivery and irregular expenditure. It therefore poses a *threat* to the BPI.

4.4.4.3 *Flexibility*

The BS workaround is utilised to bypass screens or error messages that are seen as cumbersome or irrelevant to the process completed. The control mechanism that the ERP enforces attempts to impede users from completing tasks that are outside the SCM policy. Performing a BS workaround consequently does not have an effect on the flexibility of the LGO to adjust to a changing environment or constraints imposed.

The BS workaround therefore has no effect on the flexibility dimension in BPI. Users bypass certain steps in order to complete a process and not to be more flexible in their tasks.

4.4.4.4 *Policy Adherence*

The LGO has procedures built into the ERP that prevent individuals from completing a process that does not adhere to policy. These constraints come into play when a user completes a task that does not adhere to the policy. In most instances the system will alert the user by issuing an error message. These messages come in the form of flags and are colour-coded to represent the severity of the misalignment with SCM policy. However, users found workaround practices in the system to bypass these measures. This is indicated by users pressing the enter key to continue the process.

Clerk 3 (b) states that:

“Not everyone is educated about the system or as educated as they should be. Lack of knowledge leading to them not understanding what is going on. There are messages and flags that tell you what's going on. Might not understand what the messages mean. If everyone was on the same level it would make it allot easier. Maybe the messages could be in more detail.”

She states that the lack of knowledge about regarding error messages is the main reasoning behind the enactment. Individuals who do not understand the SCM policy engrained in the system can have an adverse effect on the integrity of the BP of the LGO.

The BS workaround therefore poses a risk to the integrity of the BP. Individuals bypassing screens or error messages issued by the system can cause outcomes that are not in line with the SCM policy of the organisation. It therefore poses a *threat* to the BPI dimension in the LGO.

4.4.4.5 *Traceability*

Bypassing screens or error messages does not affect traceability, as the process is enacted in the system. It can be monitored by the control mechanism of the ERP. The process still follows the inherent structural design and continues along the intended flow. Information is not extracted or lost with this form of enactment, and it therefore has no effect in terms of the flexibility dimension of BPI.

4.4.5 Workarounds by Changing Roles (CR)

The CR workaround is executed to enable users to complete a section of the BP. The rigid control of the system prevents users from completing a process when an individual is absent in the line. As a result of absenteeism, users perform a role change to complete the process. This was identified in the LGO because of the constraints that the system imposes. It can be classified as a formal workaround practice in the BP.

4.4.5.1 *Efficiency*

The CR workaround is conducted in a formalised manner to increase efficiency in the organisation. The most commonly cited need to perform this workaround is to deal with issues raised around employee absenteeism. The enactment involves assigning parts of the BP to employees at the same or higher level in the LGO. The CR workaround aids the continuation of the BP, ensuring that output, speed and time are not affected due to an individual being absent in the procurement line.

Without this workaround and its subsequent formalisation, bottlenecks would form, as the inability to complete a task would arise due to the break in the activity flow.

The CR workaround can affect the efficiency of the system down the line due to individuals not having the required knowledge to complete the task. Assistant Buyer (c) states that:

“The buyer would normally reject. So if he is not there, the team lead is going to release everything and now sometimes I get confused, because there is this one and that one and now it is going to take longer because I must print the whole list and tick and tick and sometimes the team lead’s not even sure because the buyer knows his commodity better than the team lead.”

This hinders the efficiency of the process with the team lead, who performed the role change and does not have the required knowledge to complete the process, realising requisitions.

The integrity of the efficiency dimension is upheld when a CR workaround is performed. There is a continuation in the BP that maintains productivity and ensures output. As prescribed in the literature review of this thesis, too much control can be counterproductive to the efficiency of the system. This role change can consequently affect the efficiency with decisions being incorrectly made due to a lack of knowledge about the role adopted. The CR therefore poses both a *threat* and a *safeguard* to the BPI.

4.4.5.2 *Effectiveness*

The formalised nature of the CR workaround also has a positive influence on the effectiveness dimension of the BP. In the majority of cases individuals perform a role change in order to deal with the problem encountered. Effective processes are upheld in the procure-to-pay process with complete and correct information still being transferred with this form of enactment. The intended BP still functions as designed, as individuals in a similar role are able to complete the intended processes.

In most instances the formalised CR workaround leads to integrity in the BP. However, changing roles can cause hindrances to the effectiveness of the overall BP further down the line. As with the problem addressed above regarding a lack of knowledge and dynamics in the process, items are released to tender that would otherwise have been blocked or discarded. A problem identified is that of collective releasing by individuals adopting the role.

Assistant Buyer (a) states:

"The problem with collective releasing is maybe there are requisitions that my buyer knows that doesn't belong to us, because the other offices don't understand the difference; my commodity is to buy transport not to hire or maintenance. So they throw the repair of the car into my inbox. So if I check that this one is not mine, I skip, I skip it. The only time when I'm going to see it is when the person is looking for the commodity."

This can have negative effects in terms of the correct information and subsequent value produced by the LGO. The organisation incorporated manual checks and balances to ensure that the effectiveness of the BP is upheld.

The utilisation of the CR workaround has a positive influence on the effectiveness of the BP in terms of the constraint experienced. Without its enactment, the procure-to-pay line in SCM will experience a block in the system and cause a delay in operations. Changing roles therefore increases the overall effectiveness and is a *safeguard* to the BPI.

4.4.5.3 *Flexibility*

The dimension of flexibility is the key component of BPI in terms of the CR workaround. Being able to adapt to the constraints of the internal environment is key to the success of the BP and its integrity. Without the flexibility that the CR provides, the BP would not have the required agility to function correctly. The workflow would form bottlenecks due to the inability to complete a process. If a person is absent in the line and a requisition needs to be processed, it will affect other dimensions in the BP. National legislation installs a key principle of "separation of duties" to drive out irregular practice; however, the flexibility installed with the CR workaround ensures that the integrity of the BP is not hampered.

The CR workaround therefore has a high positive relationship with the flexibility dimension of BPI. It is therefore a *safeguard* to the BP of the organisation.

4.4.5.4 *Policy Adherence*

There is an interesting dynamic at play between the CR workaround and policy adherence. The formalised nature of the workaround ensures that the completion of a BP adheres to the spirit, if not the letter, of the formal policy. "Separation of duties" is a key component of legislation, but the enactment of a duty by an individual at the same or higher level functions well in this bureaucratic system. Managers or individuals of the same authority are able to complete the process and ensure

that the integrity of the BP is upheld. The LGO formally recognised the workaround and therefore adheres to the policy ingrained in the system.

The CR workaround has a positive relationship with the Policy Adherence BPI dimension. The workaround acts as a *safeguard* to the BP and was therefore formalised to ensure integrity.

4.4.5.5 *Traceability*

The dimension of traceability in terms of BPI, with the utilisation of the CR workaround, is not directly influenced. The BP is still recorded in the defined rigidity of the system and can be traced back in order to counter fraud, corruption and irregular expenditure. In certain instances, as identified in the effectiveness dimension, buyers who have inaccurate or a lack of knowledge about the commodity, can release inappropriate requisitions. This can still be traced in the BP, as the workaround does not go directly outside the ERP.

The tractability dimension in terms of the CR workaround does not have an effect on BPI. The execution of the workaround is in the control structures of the system and can be traced in the BP. A threat to BPI could be posed if users perform the workaround using other individuals' credentials. However, no results were found to support this claim.

4.4.6 Workarounds using Emergency Processes (EP)

The EP workaround can be referred to as an essential workaround practice and has been recognised and built into the processes; however, it is outside the artefact. It involves completing an emergency task through manual processes bypassing the system entirely. Much like the CR workaround, the LGO identified this and incorporated it as a formal workaround practice.

4.4.6.1 *Efficiency*

Emergency processes conducted manually outside the ERP are a necessary workaround in terms of environmental constraints that the LGO experiences. As a public municipality, it is essential that, if a process needs to be completed immediately, such as repair work, the job is performed and the information loaded on the ERP at a later stage. There is an "emergency clause", as it is referred to, that enables users to conduct the EP workaround and therefore formalises it in the BP. This form of enactment points directly towards the efficacy of the system. It enables output to be produced in the minimal amount of time required. As Professional Officer (a) states:

"Speak to the director. He can sign a form that allows it to go through when it is needed immediately."

The EP workaround therefore has a positive relationship with BPI. Its enactment is a *safeguard* to the BP; without its formalised nature, it would hinder the LGO from completing operations that meet requirements in the policy.

4.4.6.2 *Effectiveness*

The EP workaround is performed as a direct result of the need to uphold the efficiency dimension. The LGO views this as a necessary means to complete a process that cannot be conducted in the system due to time constraints imposed. The formalised workaround results in documentation being sent and processed according to the intended BP the following morning. The documentation being processed in the ERP the following day leads to the effectiveness of the BP being maintained.

In some instances, however, the vendor forgets to send the documentation for the work completed. This has a major influence on the integrity of the BP, specifically in relation to the efficiency dimension. Buyer (b) states:

“Sometimes the guy will forget about it and only remember he had a repair done when the vendor's invoice comes through to him. Then he'll put in the requisition - the job was done - even though it's in the past.”

This is a major hindrance to the integrity of the BP and relates to other dimensions such as policy adherence and traceability.

Buyer (a) recognises the same hindrance to effectiveness of the BP, but states that:

“If the person does not provide the documentation he won't get another chance from the buyer and he knows it. We are not all friendly.”

The user recognises the effect the workaround can have on the overall effectiveness of the process. He therefore develops a level of trust with the vendor in terms of the EP workaround. If the vendor does not provide the information, the possibility of conducting work under the emergency clause will not be made available. Due to the embedded and formalised nature of the workaround, the user constructed an identity with the client to ensure that the relevant documentation is provided.

The EP workaround has a positive influence on the effectiveness of the BP. However, in certain circumstances and under certain conditions this is a major hindrance to the integrity dimension.

4.4.6.3 Flexibility

The dimension of flexibility is the key dynamic of the EP workaround. The formalised nature allows for the BP to be completed under certain environmental constraints according to system-defined processes. The flexibility of the “emergency clause” is a key dimension to the integrity of the BP when faced with environmental constraints of this nature. The LGO as a government organisation is able to adapt to changing contexts and has the ability to deal with such problems. The agility of the BP because of the EP workaround is a key driver of success in this type of BP.

The flexibility dimension in an EP is therefore a *safeguard* to the integrity of the BPI. It allows for efficient and effective output and is defined in policy.

4.4.6.4 Policy Adherence

As expressed above, the EP workaround is built into the structures of the LGO and is defined in terms of policy. The formalised practice enables a BP to be completed in accordance with the requirements of legislation and therefore meets the requirements of laws and regulations enforced. In principle the enactment is defined by policy.

The emergency process identifies certain instances that have a major effect on the policy adherence dimension. Buyer (b) states that the process is conducted according to the emergency clause and is signed off by the director. However, problems do arise further down the procurement line that have an adverse affect on policy. He states:

“Sometimes the guy will forget about it and only remember he had a repair done when the vendor's invoice comes through to him. Then he'll put in the requisition - the job was done - even though it's in the past. The guys can steal money this way if they want to, I means [the ERP] won't know, I won't know. I'm not saying it happens, but it can happen. If it's a low amount, like R2000 or R3000, I'll just put it through and change the dates.”

This poses a major risk to the integrity of the policy dimension. The explanation points directly to issues of fraud and corrupt behaviour in the system as a result of the EP workaround. This has direct implications for irregular expenditure and unfair practice.

In terms of the process followed by the EP workaround, integrity is maintained in the BP. This is largely due to the formalised nature of the workaround and its integration into policy. The environmental constraint is unavoidable; however, as identified, major risks can be incurred with this form of enactment in terms of policy adherence and BPI.

4.4.6.5 *Traceability*

The EP workaround is performed according to the defined structures of the system. It meets the requirements of policy during its enactment and is a necessity according to the environmental constraints experienced. As identified with the problem above, the issue of fraud and corruption is raised in terms of the results of the enactment further down the procurement line. This hinders the traceability of the information in the system and affects Information Integrity. If individuals forget to submit the required documentation for processing the following morning to the system, it can cause a risk to the integrity of the BP through lack of traceability.

With any workaround external to the system, the dimension of traceability will always be undermined. In the majority of cases encountered, users obtained the correct information and the traceability dimension was upheld in terms of BPI. However, as identified, this can pose a serious *threat* to the integrity of the BP if the information is not obtained and processed after the completion of the workaround.

4.4.7 Workarounds in Mediation (ME)

The ME workaround involves individuals asking others for assistance when a lack of understanding or confusion forms around a process. It forms a community of practice around the processes of the system. The ME workaround will be analysed in terms of the BPI dimensions in order to determine their relationship.

4.4.7.1 *Efficiency*

The ME workaround has a positive relationship with the efficiency of the BP. Users adopt a culture developed in the organisation derived from the values installed in the LGO. Users are encouraged to conduct knowledge-sharing activities and “ask for help” when they encounter problems. This knowledge-sharing process will increase the efficiency of the BP. When users experience problems, they generally use a phone or walk to others for assistance. This will have a direct influence on the output and speed of the BP in the long run as users gain knowledge of the issue. The enactment can happen in a multitude of avenues with the result being a community of practice geared towards knowledge sharing that increases efficiency.

When the procurement line experiences a problem due to mistakes made in the BP, the ME workaround is often performed. In some instances users will simply reject a requisition, as it contains incomplete or inaccurate information. As noted in the majority of interviews with buyers in SCM, they simply reject a requisition that does not meet the BP requirements. This rejection will

redirect the information flow back to the previous end user to correct it, in accordance with the process flow designed in the system. However, in order to increase the efficiency of the system, users will perform a ME workaround further down the procurement line to increase the process. This allows for the correction to be made in an efficient manner. Users often develop a relationship among themselves that creates a knowledge-sharing environment that increases the efficiency of the process. Buyer (d) states that:

“Because IT has such a high flow of requisitions coming in, I sometime just, on an e-mail ... I drop them an e-mail and say 'this requisition, insufficient info, please correct, please rectify. So you don't reject, you build up a [relationship] because it saves time. Sometimes the person that created it isn't there, so the other person wouldn't know. There are certain times when you say, 'reject it'. I will actually pick up a phone for instance and say look, I can't create because there is no info; please, can you see that it is there. They get a move on and I do my work.”

This enactment therefore increases the efficiency in the procurement line, as users are able to complete tasks more efficiently based on the knowledge gained from the enactment.

The ME workaround has a positive influence on the efficiency of the BP. Users perform a workaround in order to complete a process that would have otherwise hindered their output flow. The integrity of the BP is upheld and the formation of a community of practice centred on knowledge sharing allows for increased productivity and speed of output, especially in the long-run. The ME workaround therefore acts as a *safeguard* to the integrity of the BP in terms of the efficiency dimension.

4.4.7.2 *Effectiveness*

The ME workaround has a clear relationship with the effectiveness of the BP. Users adopting the workaround allow for a transfer of knowledge to complete a process more accurately and therefore produce a better quality final output. From the data obtained in the interview process, the culture installed in the organisation initiates this type of workaround practice. Individuals are encouraged to approach others employees when a section in the BP is confusing or the user lacks understanding in a process. This forms a community of practice where knowledge is shared among users in the organisation. The layout of the offices plays a large role in this enactment, with an open working environment in which users are able to converse easily among each other.

The ME workaround therefore allows users to increase the effectiveness of the process by using informal communication to aid the enactment of the process. This increases the effectiveness of the

system. Buyer (d) states the following enactment in order to complete a process rather than simply rejecting a requisition coming in. He states:

“I didn’t get training in how to create a requisition. Even though at one stage I had a screen dump of what they see and where to start and that is what I use to help people. I mean I don’t know how to do it, but here is an example of how to do it. And help them figure out, they know which buttons to press. It helped but it shouldn’t be that way because just like they expect us to know how to do our jobs, they should know how to do theirs.”

This enactment therefore helped the line to produce more accurate and quality information for him to process. The problem experienced was due to incorrect information or a lack of information. The buyer therefore e-mailed or phoned the user in the line, utilising the ME workaround, and increased the effectiveness dimension in the BP.

The ME workaround therefore increases the effectiveness of the BP. Users aid each other in the process in order to meet quality and accuracy standards of effectiveness in the process. The ME workaround is therefore a *safeguard* to the integrity of the BP.

4.4.7.3 *Flexibility*

Flexibility in the BP is not directly affected by the ME workaround, as the system is still able to be agile in terms of the processes being followed. Flexibility of the BP may have been indirectly affected as users are able to be more agile in their completion of tasks. If an unknown situation arises or a lack of knowledge on how to complete the process is experienced, the users are able to perform a workaround in order to complete the process. They are able to consult other employees on how to deal with a difficulty encountered and in doing so be more flexible in terms of their enactment.

The flexibility of the BP has a minimal relationship with the BP workaround. The integrity of the process is upheld to a certain extent, as individuals are able to enact in a way that is flexible in terms of the constraints experienced in their environment. The workaround therefore acts as a *safeguard* to the BP and upholds the integrity of the dimension; however, this has only minimal influence.

4.4.7.4 *Policy Adherence*

The ME workaround does not have a relationship with the policy adherence dimension in BPI. The enactment is in the processes of the system and does not deviate from the intended design and work flow built into the structures of the system. Fraud and corruption are not a factor in this type of

process. The workaround will indirectly affect ineffective expenditure as users produce output that is more accurate and of better quality. The workaround therefore aids the system, although minimally, in achieving a fair, equitable and cost-effective system in line with policy.

The ME workaround therefore has no influence on the integrity of the policy adherence dimension. The workaround is in line with the intended policy with no deviations from the structures being enacted.

4.4.7.5 *Traceability*

The effect of the ME workaround on traceability is much in line with the policy adherence dimension. The workaround does not deviate from the intended workflow in the system and completes a process that can be monitored in terms of the internal control measures imposed. The dimension can have an indirect effect on the enactment of users. This is due to the fact that users are aware of the traceability in the system and the need to complete a process that is accurate. The value and culture in the organisation also contribute to this enactment.

The ME workaround therefore has no effect on the traceability dimension in the BP. The integrity of the BP is not positively influenced or hindered by this enactment.

4.5 **Application of Dimensions and Identified Areas of Concern**

The results of the qualitative investigation at the large LGO produced a number of key results regarding the relationship between BPI and workaround practices enacted by end users. Each workaround practice identified has an effect on the integrity of the BP. However, some workarounds do not influence certain dimensions explicitly. In order to represent the results in holistic form, a model was developed. It enables the researcher to identify the exact areas of threat or risk to the integrity of the BP, as well as areas where the workaround proves to be a safeguard to the process.

4.5.1 **Business Process Workaround (BPW) Model**

The BPW model is presented in table 8. The model provides an amalgamated representation of the findings of the empirical study. The *x* axis represents the workarounds identified from the data obtained. Each is addressed according to the categories identified in the results of this chapter. The *y* axis represents the BPI dimensions developed in chapter 2 of this thesis. Acronyms used are reminiscent of the hypotheses being tested. The “R/T” refers to a Risk/Threat posed to the integrity

of the BP, with “SG” referring to a safeguard. However, in some instances the relationship can attest to both a threat and safeguard. These are identified by “Both”. Some workarounds have no effect on the relationship between the two constructs; these are represented with “n/a”.

The table provides an overview of the relationship between BPI and workaround practices. In order to quantify this relationship, a results column was included on the y axis. The results represent the over-arching relationship of each workaround with the integrity of the BP according to the interpretation of the researcher. Consequently, the results column outlines the findings of the research study conducted.

Table 8: BPW Model

		Workarounds						
		ES	DM	VS	BS	CR	EP	ME
Business Process Integrity	EFI	SG	R/T	SG	SG	Both	SG	SG
	EFE	R/T	R/T	SG	R/T	SG	Both	SG
	FXI	SG	SG	SG	n/a	SG	SG	SG
	PAD	R/T	n/a	SG	R/T	SG	Both	n/a
	TRC	R/T	n/a	R/T	n/a	n/a	R/T	n/a
Result:	R/T	R/T	SG	R/T	SG	SG	SG	

4.5.2 Key Areas of Concern

From the BPW model in table 8 we are able to identify the most prominent areas of concern regarding the effect of workarounds on the integrity of the BP. The results indicated that the external systems, data manipulation and bypassing of steps pose the greatest threat to the integrity of the BP for the LGO. The other four workarounds performed, although safeguards to the integrity, also pose risks to specific dimensions. Thus the dynamics of their enactment need to be understood in terms of the consequences it has for the procure-to-pay process down the line.

Informal workarounds are a serious risk that the organisation needs to manage. The data obtained from the interviews reiterates this argument. Buyer (b) recognises the social dynamic of the IS and how this plays a key role in the utilisation of informal workarounds that pose a risk to integrity:

"It's a good system, I just think, and it's not [the ERP's] fault, people don't know how to use it correctly. It's not really loopholes, but let's call it loopholes. The functionality to do things correctly exists in [the ERP] but the users don't know about it or don't know how to use it correctly."

According to the buyer, user enactment is hindered by a lack of knowledge of the system. The results of ineffective training and knowledge-sharing activities in the organisation have a significant effect on the utilisation of informal workarounds.

The organisation's formal or informal recognition of a workaround provided a noteworthy conclusion. The organisation recognised, for example, the emergency process workaround and it was subsequently built into the structures of the LGO. The enactment is still outside the ERP; however, due to the environmental constraints recognised, the LGO built this into the process. The formal workaround practices are therefore designed as a safeguard to the BP; the results confirmed this. Consequently, it is the informal workarounds that pose the greatest risk to the integrity of the process.

The issue of informal workaround practices are echoed by the ERP SCM team. Recognition of a lack of trust in the system is identified. They state:

"There is a whole lot of legislation and policy that is built into the system. So often users if they don't understand why the system does something they are going to query it and not trust the system but the more they know the process the more they will understand why the system has done it and trust the system to do it. That is one of our big advantages here is the ability to hard code the business process. So there is one procure to pay process that the whole organisation must use. Ensure consistency."

As a result, the ability to formalise workarounds is recognised. There is recognition of the need to build trust in the system and, in doing so, remove informal practice.

The formalised nature of workaround practices is crucial to the success of the organisation. By identifying certain process in the constraints of the environment, the organisation is able to support the need for necessary workaround practices. By driving out informal practices, with improved training and knowledge, the organisation is able to conduct processes according to the intended design of the system. This is fundamental element of success.

The ERP team provide a summation of this argument in their reflection of the business processes installed in the ERP:

“The System should reflect the business process; the moment the business process and [the ERP] are not aligned things go for the wrong. The moment you can restrict [the ERP] to that rule then it is fine. [The ERP] can be tweaked but you can’t build your business rule around [the ERP], that is the wrong way around. We need to build it to make your business work and if your business changes, you need to change [the ERP]. You need to change the IT and the technology side of it to be in line with it otherwise you are definitely going to lose out on it eventually. I think that is something we try to achieve from this side, that’s adhering to the business process.”

Formalising certain workaround practices can have positive benefits for the organisation to ensure integrity of the business process. The results obtained indicate that removal of workarounds is not the solution to safeguard integrity. Rather, formalising necessary workaround practices into the process and decreasing informal practices can lead to business process integrity.

4.6 Chapter Summary

The chapter outlines the findings of the qualitative research study at a large LGO. The findings are discussed according to the data set consisting of both documentation and semi-structured interviews. These results aim to determine the relationship between BPI and workaround practices that users enact, in accordance with the research question. The workarounds identified in the data are the focus of this research study, with an interpretation being made of the influence on the integrity of the business process. The factors influencing their enactment were first addressed, followed by the categorisation of the practices identified. A total of seven workaround categories were reported on individually. This introduces the reader to the findings obtained from the interview data. On the classification of workarounds, definitions were provided for each and placed

in a table for ease of reference. The next section re-introduced the BPI framework developed in chapter 2 of this thesis.

The BPI framework provides the necessary lens to analyse the identified workaround practices according to the developed integrity dimensions. Therefore the influence of the workaround was analysed in terms of each of the five dimensions developed in the integrated framework. Results proved to be extensive and enabled the researcher to determine the relationship between the two constructs being analysed. Each relationship being analysed provided an understanding of the effects of workarounds on the BP, and classified these in terms of threats or safeguards in accordance with the hypotheses established at the commencement of the study. The final section introduces the Business Process Workaround (BPW) model. The model serves to amalgamate the findings into a matrix format in order to determine specific areas of concern. Consequently, the results could be represented in a clear and precise manner. The findings of the chapter unpack the complex and dynamic nature of the relationship between BPI and workaround practices.

CHAPTER 5

SUMMARY, LIMITATIONS AND FUTURE RESEARCH

5.1 Introduction

The purpose of this chapter is to provide a summary of the findings of the qualitative research conducted at a large LGO. The motivation is drawn from a need to review the overarching argument of this thesis. Consequently, this will enable the contextualisation of findings in terms of the research question posed. Section 5.2 will provide a summary of the findings produced from the research on workaround practices and business processes. The argument developed throughout the thesis will be explained, addressing the major findings of the study and the interpretation of the results. A conclusion to this argument is presented in section 3. The implications of the research to the field will be addressed in section 4. Any research study has certain limitations and weaknesses that need to be acknowledged. Section 5 will discuss these and address possible avenues to extend the research based on these limitations. The final section of the chapter presents recommendations for future research topics in the field of IS.

5.2 Summary of Findings

The integration capabilities that large IT artefacts (such as ERPs) provide, offer major benefits to organisations in the current knowledge economy. Organisations require real time data, information flow and integration across functional departments to remain viable and competitive. This attracted the attention of both organisations and academics alike. Subsequently, researchers from various domains addressed multiple dynamics related to the field of ERPs. Although the artefact promises much, the returns often failed to match the expectations of organisations (Umbel *et al.*, 2003; Ignatiadis & Nandhakumar, 2009). This prompted a focus on research into the reasons why this failure rate is so prominent. The literature, although large, is rather fragmented with regard to post-adoption effects on organisations and especially the socio-technical dynamics prevalent in such IS.

The field's understanding of the internal dynamics of ERPs, although recognised, remain limited. This research addressed this problem with a focus on workaround practices that end users perform.

A review of the literature available enabled the researcher to identify a specific gap in the field and thus proposed the following research question:

What is the relationship between business process integrity and workaround practices?

Exploring the relationship between the two phenomena identified aimed to understand how users enact technology when faced with problems caused by the rigid control mechanism enforced. Business processes are defined by the structures embedded in the system and understanding their relationship with workarounds enables an analysis of the integrity of the workflow. The following hypotheses were therefore proposed:

- 1) workaround practices that end users of ERPs enact pose a *threat* to business process integrity in organisations; and
- 2) workaround practices that end users of ERPs enact serve as a *safeguard* for business process integrity in organisations.

5.2.1 Framework Development

In order to answer the research question and build an argument about the relationship between workarounds and BPI, a review of the literature was conducted. As a result, large sections of literature were reviewed with a particular focus on ERPs and their impact on the business process. Following a review of the literature on ERPs (specifically post-adoption) to build a context in the study, a review was conducted on business processes in organisations. The review introduced the field of BPM and analysed the functions and characteristics that define a business process. Research done by scholars that focuses on business processes in large IT artefacts was reviewed. This enabled the researcher to draw conclusions from the vast amount of literature and, in doing so, develop an integrated framework for the study. The BPI framework constituted five key dimensions that establish integrity in the business process, namely efficiency, effectiveness, flexibility, policy adherence and traceability.

Following the development of the framework, the literature on workaround practices in ERPs was addressed. An argument is built on the fallacy of “best practice” approach to IS and the mechanical processing of IT artefacts of this nature. This introduced the concept of misfit as a result of the ERP’s mismatch between organisational requirements and the processes embedded. The argument was developed from the problems that users of the system experience and therefore introduced how users workaround such problems. The research on workarounds is limited; however, it falls in line with the human agency perspective. This enabled the researcher to develop an understanding of

how users are free to enact with technology in different and often unintended ways. This culminated in a review of the research on workaround practices in organisations that adopted a large IT artefact.

The literature review enabled the identification of key concepts, theories and defining research in the field. The argument that was developed provided a structure to the subject being addressed and established the context of the research problem. The development of the framework for the study was central to the argument of the thesis and was subsequently applied to the empirical investigation conducted.

5.2.2 Empirical Investigation

The development of the integrated framework provided the necessary means to conduct an empirical investigation into workaround practices that end user enact in an organisation. It was therefore necessary to provide the second half of the research design based on this framework and the understanding of the concept of workarounds. The empirical investigation utilised a data set compiled during an extensive study of a large LGO using a proprietary ERP product. A case background was provided in order to understand the context of the organisation being investigated. Problems were identified and the case was made as to why BPI is a major issue faced by such organisations. This made the case particularly applicable to the research question posed.

In order to answer the question, data needed to be collected. Data collection was conducted using a qualitative study to identify workaround practices of end users and the reasons for their enactment. Data collection involved the use of both documentation and semi-structured interviews and followed the principles prescribed by Yin (2009). Each data collection method was analysed individually to explain the processes followed to compile the data set. On conclusion of the data collection and the transcribing of raw interview data, the methods adopted to analyse the data were addressed. A coding technique that Miles and Huberman (1994) prescribe was applied to qualitative data analysis. This involved the use of both descriptive and pattern-coding techniques.

Due to the large size of the data set, analysis of the transcribed interviews needed to be done in an efficient and effective manner. Descriptive coding enabled the researcher to organise the transcribed data into manageable “chunks” and segments of text before applying meaning to the information. This was done by attributing a class of phenomena to a segment of text, as prescribed by Miles and Huberman (1994) and Creswell (2009). The class of phenomena identified for the descriptive coding included misfits, workarounds, major risks/threats and general comments. On completion of the descriptive coding, pattern-coding techniques were adopted. It enabled the researcher to “illustrate an emergent leitmotiv or pattern that [was] discerned in local events and relationships”

(Miles & Huberman, 1994:57). The major themes identified by the pattern coding were then drawn out during the analysis, which allowed for intelligent interpretation.

On completion of the data analysis, a discussion could be drawn from each major theme or pattern that emerged. These were maintained in the context of the BPI framework developed. In order to quantify results, the workarounds identified from the analysis phase were discussed. It was important to address the factors that influence users' enactment before addressing the specific workarounds identified. These factors included policy, management, developers, external environment and the artefact. Each factor was addressed individually in order to develop an understanding of the influence on enactment. By identifying the factors based on the results, the underlying dynamics of user enactment were addressed.

The pattern-coding techniques adopted in the analysis identified specific classes of workaround practices that end users performed. Users performed specific workarounds depending on the context and misfit experienced. However, the patterns identified seven distinct categories. These are external systems, data manipulation, verbal signature, bypass steps, changing roles, emergency processes and mediation. Each workaround was analysed individually with examples provided based on data obtained. This discussion proved influential for two reasons. Firstly, it introduced new workaround practices that were not identified in the literature. Secondly, the workarounds identified and categorised allowed for an analysis to be made by means of the BPI framework developed. It was therefore important to re-introduce the integrated framework at this stage.

5.2.3 Major Themes Addressed

To answer the research question, each workaround category needed to be analysed in relation to the BPI dimensions developed. This would enable the researcher to determine the relationships between the two phenomena. This was based on the hypotheses proposed (*threat* or *safeguard* to the integrity of the business process). Each theme will be addressed below, providing a short definition in relation to the findings and the proposed effect on BPI.

External system workarounds involves the process of using systems external to the artefact to complete a process. It involves the manipulation of data external to the system when carrying out processes. This is recognised as an *informal* workaround. The most notable example drawn from this category was the use of Microsoft Excel to complete a section of the business process outside the artefact. The relationship with BPI proved interesting. The workaround increased the efficiency and flexibility of the user with regard to the BPO. Users were able to execute the workaround to produce an output faster and to use the software to become more flexible. However, this

workaround posed major threats with regard to the other three dimensions. Effectiveness of the business process was hindered due to the nature of the workaround. Exporting information outside the ERP resulted in a decrease in quality and accuracy of the data. This also posed a threat to policy adherence due to processes being completed outside the ERP. Traceability was also an obvious threat due to the external nature of the workaround. Therefore the external systems workaround poses a *threat* to BPI.

The next identified workaround is data manipulation. The artefact constrains the user to input a value in a relevant field in order to continue with the process. Fictitious data is entered to ensure this continuation. It also involves the entering of data that is known to change or become inaccurate. It is an *informal* workaround. The workaround provided interesting results regarding the efficiency and effectiveness that users perceived. However, it posed a threat to BPI further down the procurement line, as individuals needed to wait or refer back to ensure that correct data was inserted when provided. This decreased output time and quality. It did, however, enable the users to be more flexible in their processes in the system. No relationship was deemed to exist between policy adherence and traceability. The workaround, due to the adverse effects down the line, was regarded as a *threat* to the BPI.

The verbal signature workaround is the use of phone, e-mail or other means to complete a process. It is a social approval among actors to complete a step in the business process. The verbal workaround practice involves explicit social interaction. The organisation recognised this workaround due to environmental constraints imposed; it is seen as a *formal* workaround. According to Azad & King (2008), it adheres to the “spirit” if not the letter of the policy in order to complete the process. It was enacted to ensure both efficiency and effectiveness to guarantee that output was maintained and the required value attained. It therefore adhered to the efficiency, effectiveness and policy adherence dimensions. Flexibility was also increased by the nature of its enactment. Traceability, however, was a major risk, as a section of the process was completed external to the ERP. The verbal signature workaround was therefore defined as a *safeguard* to BPI.

The bypassing steps workaround is the non-use of the system and involves the bypassing of certain steps or skipping/omitting screens in the process. It involves instances of manual or informal bypassing of the defined structure. It is an *informal* workaround practice. This form of enactment enabled the end user to become more efficient, as processes and procedures could be completed in a short amount of time to increase output. However, bypassing steps in the process influenced the quality and accuracy of the data, posing a threat to effectiveness. Policy adherence was also

hindered due to not completing defined processes set out by the ERP. There was no effect in terms of flexibility and traceability. Therefore, the workaround was deemed a *threat* to the BPI.

According to results, users often performed a changing-role workaround. In many instances individuals perform a role change to complete a process due to absenteeism. The rigid control of the system prevents the intended user from completing a section of the process. This enactment ensures that the required process can be completed. This is identified as a *formal* workaround practice. The need for the workaround was apparent due to an individual not being available, causing a break in the procurement line. To avoid “bottle necks”, users perform this workaround to be more efficient, effective and flexible in their processing. It enabled the business process to be carried out by other individuals of a similar or higher position. This increased output speed and maintained the value of operations. Being recognised by the organisation ensured policy adherence. However, it can have a negative effect on efficiency due to individuals processing information with the incorrect knowledge, causing delays as processes are routed back. Traceability was not affected, as processes were maintained in the ERP. The workaround was thus deemed a *safeguard* to the integrity of the business process for the organisation.

A key workaround identified from the data was the emergency process developed into the business process. It was explicitly built into the business processes; however, it is outside the artefact. It involves completing an emergency task through manual processes bypassing the system entirely. This is identified as a *formal* workaround practice. The workaround is a key driving factor to the success of an organisation. Due to constraints imposed by the environment, certain processes needed to be completed immediately external to the artefact. The process was then completed as designed at a later stage. The workaround had a positive influence on the efficiency and flexibility of the business process. However, the results showed that this formalised workaround can have an adverse effect on the quality and accuracy of information. Effectiveness was therefore hindered. Traceability was also recognised as a major problem with users forgetting to re-enter data. This was explicitly recognised by one user who stated that it can incur costs to the organisation. The workaround is defined in policy and adhered to the dimension. However, due to the lack of traceability in some instances, this can produce a threat to policy adherence. The emergency process workaround was deemed a *safeguard* to the organisation despite notable problems occurring during its enactment.

The mediation workaround was the last workaround category identified. It involves individuals asking others for assistance when a lack of understanding or confusion forms around a process. It forms a community of practice around the processes of the system. This workaround is identified as

an *informal* practice. It involves knowledge sharing activities by end users to increase the efficiency and effectiveness of the business process. Users were able to produce higher output and increase the accuracy of information. Flexibility was increased with greater knowledge of the business process. Policy adherence and traceability were not affected, as information and processing were maintained in the ERP. The mediation workaround was deemed a *safeguard* to the business process.

The relationship identified between BPI and workaround practices introduced noteworthy results. The research question was answered in terms of the relationship between the two phenomena. In doing so, an interesting dynamic was determined. In the case where users performed an informal workaround practice, it resulted in a threat/risk to the integrity of the business process. Certain dimensions might have produced a positive relationship; however, the overall result was one of threat. The only workaround with which this was not the case was mediation. Consequently, all the formal workaround practices that the organisation identified proved to be safeguards to the business process. Both managers and directors acknowledged the need for a workaround and incorporated it in both policy and the design of the business process.

The results presented from the study introduced valuable insight into the complex socio-technical dynamics of workaround practices. By identifying the relationship between BPI and workaround practices, both academics and practitioners alike can highlight specific areas of concern. Energy can be focused on decreasing informal workaround practices based on the identified areas. The research can also produce positive benefits to organisations similar to the LGO. The formalised nature of certain workaround practices was identified as a major driver of success of the IS. Formalising certain workaround practices can produce positive benefits to organisations that experience major problems with regard to the complex IT artefact. By focusing on driving out informal workarounds and formalising necessary workarounds, organisations can improve the integrity of their business processes.

5.3 Conclusions

The research question addressed at the commencement of this study is complex with regard to identifying the socio-technical dynamics prevalent in organisations post ERP adoption. Understanding user behaviour in an IT artefact is multidimensional due to the very nature of its enactment. Users have subjective understandings of the world around them, and the way they understand their context affects their enactment. Understanding users' enactment of technology is at the heart of this research study.

One cannot simply understand workarounds as a holistic construct. Each workaround is different and is enacted in a specific context. Categorising workaround practices helps to identify how users adopt a procedure to deal with an instance of misfit experienced in the business process. By unpacking this complex social dynamic, we are better able to understand the reasons for IS success or failure in organisations that adopt proprietary ERP products.

By conducting the analysis in terms of business processes and specifically the integrity thereof, research could be focused on a particular element of user enactment. The complex question that was analysed in terms of business processes produced a complex answer. Workaround practices cannot be viewed as a general practice that users adopt. There are a multitude of factors that influence enactment, such as policy, managers, developers, environment and the artefact itself. These factors influence users' behaviour and the way they enact technologies.

The BPI framework, while allowing the relationship between the two phenomena to be investigated, also reveals the complex dynamics of workaround practices. Although the workaround that a user performs may be deemed a *safeguard* to the integrity of the business process, as identified by formal workaround practices, there are dimensions in the framework to which it may pose a *threat*. Therefore each workaround needs to be considered in terms of each dimension of the BPI framework in order to understand the multifaceted relationship between the two phenomena and the complex dynamics of artefact enactment.

The results of this study reveal the complex relationship between BPI and workarounds. However, it is important to bridge the gap between research and practice. The results offer insight to organisations that adopt an IT artefact that integrates business processes, such as ERPs. In most instances organisations try to oust workaround practices in order to subscribe to “best practice” methodologies that are built into the system. This research, however, suggests that the objective should not be to drive out workarounds, but rather to identify instances in which workarounds are necessary in the organisation's environment. Formalising necessary workarounds and building them into the business process are crucial to the success of an organisation in current complex and changing environments.

Formalising required workarounds and ousting unwanted workarounds appear to be an appropriate recommendation to practice. However, the argument still needs to be defined in the context of the problem. Formalising necessary workarounds does not imply that the artefact needs to be completely customised to “fit” the needs of the organisation. This is not necessarily the only viable solution. In fact, business process integrity can be achieved without extensive artefact customisation. Customisation complicates the artefact and its maintenance, raising the chances of

project failure. Rather, it can be argued that necessary workarounds, such as Emergency Processes, Verbal Signature and Changing Roles as identified, need to be built into the business processes of the organisation. This would enable the organisation to be more flexible at user-level. The ERP team confirms this:

“We use [the ERP] standard and this is very important. [The ERP] as we refer to it in general terms. We don’t try and build a new report or new functionality through other means and so forth, we try and stick to the general straightforward [ERP] because once it comes to upgrades, it is easy to upgrade. There are still people who sit on their old system, [the ERP] does not make enhancements on the old systems; they refuse. You need to move over to the new solution and they can’t because of all the customisation that they have done within their [ERP] and it becomes difficult for them to move forward. So we try and stick to [the ERP] standard as far as possible. It needs a very good reason to move outside of that if need it be.”

Formalised workarounds enhance an organisations ability to deal with non-standard business processes. This proves to be a necessary benefit to organisations adopting a proprietary ERP product and operating in a complex business environment. Ousting informal workarounds, by means of improved training and change management principles, is essential, but formalised workarounds prove pivotal. However, formal workarounds developed in an organisation’s business process and policy still need to be understood in terms of their complex nature. All formal workarounds identified in this research posed some form of *threat* to the integrity of the business process. Therefore managing the risks of formalised workarounds is a fundamental element of the complex nature of workaround practices. According to the results, formal workaround practices enable organisations to acquire the necessary balance between control and flexibility needed to maintain integrity of the business process.

5.4 Implications for Research Field

The field of IS requires further attention to post-implementation workaround practices and the resulting soft issues identified; this research aimed to address that need. It is significant, as it produces novel insight into workarounds that develop in a large organisation that adopted a proprietary ERP solution. The relationship between BPI and workaround practices determines specific areas of concern that have not been addressed by research in the field. The post-implementation effects of ERPs are fragmented in terms of research conducted. Therefore the findings presented above deepen the knowledge base on workaround practices and enable future academics to gain an understanding of the relationship between the two phenomena.

The research contributes to the social issues identified in organisations that adopted ERPs. By understanding the soft issues related to user enactment, a contribution can be made to the field of IS. “Viewed overall, IS literature offers only the rather mechanistic model of organization which derives from Simon and is based on rational decision making in pursuit of organizational goals” (Checkland & Holwell, 2005:74). Addressing IT enactment in organisations enhances our understanding of IS.

The value of the results is seen as two-fold. Firstly, academics in the field of IS, and specifically ERPs, can apply the results to the context of their own research. Understanding the effects of workarounds on business processes prove to be a key element of success. Furthering this knowledge base provides a clearer understanding of how users enact technology and how to identify soft issues of concern. Secondly, the research has practical significance. An increased understanding of the formal and informal workaround practices enables both the LGO under investigation and other organisations in a similar environment to increase the integrity of their business processes. These workaround practices are often not apparent or not seen as a major influence and thus ignored. Focusing on minimising informal workarounds and establishing formal workaround practices can enable LGOs to decrease irregular expenditure and increase service delivery. Business processes can be improved by understanding the complex social phenomena prevalent in organisations that adopt integrated IT artefacts.

5.5 Limitations and Recommendations of Research Study

As with all research studies, there are certain limitations or weaknesses. The purpose of this section is to acknowledge the limitations of the research, focus on the variables outside the control of the researcher and the effects that these have on the validity of results (Bui, 2009). The limitations identified will tie in with recommendations for researchers conducting studies of a similar nature.

The research investigation utilised a data set compiled by means of a qualitative case study. The singular nature of the study enabled the researcher to understand how individual users, when faced with a problem, perform a workaround solution. However, in many instances the phenomena identified are specific to the organisation in question. Therefore the workaround practices identified in the qualitative data analysis refer directly to the environment in which they are enacted. Public organisations have both different political bodies influencing enactment and, in most instances, a different artefact governing the business process. This reason limits the results in terms of all LGOs in the Republic of South Africa. A conclusion cannot simply be made that these are the workaround

problems facing all local government organisations in the country. To quantify the results in terms of the threats of workarounds on large LGOs, a multiple case study approach would need to be conducted. This would enable a more accurate representation of workarounds in accordance with cross-organisational differences.

The BPI framework developed in chapter 2 is based on a few key authors in the original design. This is partly due to the fact that the literature available on business process integrity is limited and has not been fully analysed in terms of ERPs. Karimi *et al.* (2007) provide the foundation for the conceptualisation of efficiency, effectiveness and flexibility of the business process with regards to BPO. The three concepts developed by the authors form a large part of the framework with regards to the dimensions, however, the authors original conception is designed on implementation. For the BPI model developed in this thesis, the dimensions are adjusted according to post-adoption effects. These are backed up with reference to both Karimi *et al.* (2007) and other notable authors within the field of Business Process Management. The model, although to a large degree integrated in its post-adoption design, is limited to only a few key authors that are extensively used in its development.

The data obtained in the qualitative research poses limitations to the study. Both documentation and semi-structured interviews were used in the study. Yin (2009) addresses the limitation of reporting bias in terms of documentation in qualitative research. Due to the formal policies and workflow diagrams used, this was not deemed a major limitation. However, the original author compiled the documentation for a specific audience and will have a level of bias towards the information provided. This needs to be recognised in terms of the information obtained from documentation provided.

The semi-structured interviews conducted as the second part of the data collection introduce further limitations to the study. Biases and reflexivity are a major concern to qualitative interview data. Although necessary measures were taken to counter this limitation, certain respondents could still have been influenced by the nature of the research. Anonymity of response was made clear to the respondents, but addressing the issues and problems experienced with the system is often difficult to extract. Users tend to shy away from issues in fear of potential consequences that results could provide. Reflexivity, in which the interviewee gives what the interviewer wants to hear, is another limitation to the interview process. Users' responses can potentially be guided by what they perceive the researcher to be looking for.

The interpretivist approach that the researcher adopted to respondents' answers is also an area that is noted. As identified by Miles and Huberman (1994:8), "researchers are no more 'detached' from their objects of study than that are their informants. Researchers have their own understandings,

their own convictions, their own conceptual orientations; they, too, are members of a particular culture at a specific historical moment. Also they will be undeniably affected by what they hear and observe in the field, often in unnoticed ways". The interpretive approach to research has inherent limitations in any context for the researcher.

The final limitation addressed by the researcher is that of observation with regard to workaround practices. The qualitative study used two data collection principles to triangulate results. However, the use of observation to collect data is a valuable tool in qualitative case studies. The organisation under investigation did not enable the researcher to conduct this form of investigation, but it would have proved insightful with regard to this form of enactment conducted in the organisation. In certain instances, workarounds became end users' embedded routines (Nelson & Winter, 1982; Cook & Brown, 1999; Feldman & Pentland, 2003 & 2007; Eisenhardt & Martin, 2000). These routine practices are so rooted in the enactment of a business process that users do not recognise the existence of a problem. Misfits are identified as the cue for workaround practices; however, certain workarounds are executed in such a routine manner that it is hard to be identified by means of interview data.

5.6 Future Research Areas

The limitations of the research study addressed above identify areas of concern regarding the study. These limitations, albeit difficult to control, opened up possible avenues for future research into the relationship between the integrity of the business process and workaround practices. A multiple case study approach and the use of observations in qualitative research are recommended. According to Bui (2009:199), "you can tie the recommendations for future research to the issues that were identified in the limitations section". Consequently, this was presented above. The next section will introduce possible research studies that can continue or expand the research conducted.

Based on the results of the study, future research can be conducted into the BPI dimensions framework developed. The research can focus specifically on an individual dimension (that is seen as crucial to the success of the organisation) and conduct an analysis of the effects of identified workarounds in that context. Alternatively, the same dimensions can be applied to a different case study to determine different relationships between workarounds and BPI. This will look to advance the framework as well as address the need for additional case studies to be conducted in order to analyse different workarounds in similar settings. Building on this line of research, a model can be developed to identify and formalise workaround practices in IS.

A key future research area is to conduct a similar study on another LGO in South Africa that has adopted a large IT artefact. A comparative study could then be conducted using the data obtained in this study and evaluating the different workarounds identified in the two organisations. The BPI framework can be used to address areas of concerns regarding different workaround practices identified in the two organisations. A more refined study could further this, conduct research into three metropolitan municipalities and triangulate the results obtained.

Longitudinal studies are another possible research approach. Feldman and Irvine (2008) address the need to conduct research in both cross-sectional (synchronic) and longitudinal (diachronic) studies. This research addressed the cross-sectional dynamic of empirical research and focussed on workarounds at a particular point in time. A longitudinal study will be able to determine the changing workaround practices and whether or not these are directed towards the integrity of the business process.

As addressed, future research into a multiple case study approach, could determine different dynamics and processes with regard to individual success or failure of the artefact. The BPI framework can open up instances of workarounds that allow for one LGO to be more successful than another. This can also introduce an important dynamic of culture and values installed in different organisations and how this effects enactment. The values and culture embedded into the processes of the organisation is a future research avenue that needs to be embarked on. Research into these conditions can produce results that point to the reasons why workarounds develop and how they affect the integrity of the business process.

The role of culture and values is a notable future research topic to study in IS. Another is that of trust. Luhmann (2000) addresses the issues of trust explicitly. Based on this type of research and that of others regarding trust, the way in which users who perform workaround practices are influenced by their trust in the system, can be researched. Research in this field can assist in bridging the gap between the complex social dynamics of organisational science and IS theory.

The work of Morgan (2006) and the machine metaphor are addressed in chapter 2 of this thesis. A possible research area would be to conduct an analysis using the eight different metaphorical perspectives on organisations to understand the specific nature of the organisation. Developing an understanding of the situation and nature of the organisation, enable the understanding of workaround practices performed by end users. The type of organisation can also point to possible relationships between BPI and workaround practices. Conducting an analysis into the different types of workarounds that develop in an organisation functioning as a machine and another that functions in an ad hoc environment can prove beneficial. The evidence obtained from such an

analysis can contribute to an understanding of different workarounds in structured and fluid business process environments.

The result of workaround practices becoming embedded routines into the everyday practices of end users was briefly addressed. Nelson and Winter (1982), Cook and Brown (1999), Feldman and Pentland (2003 & 2007) and Eisenhardt and Martin (2000), among others, address the work on organisational routines. This type of research can extend the theory of organisational routines and develop an understanding of how workaround practices can be embedded into the processing of the ERP. Identifying routine workarounds can determine possible relationships with dynamics capabilities (Eisenhardt & Martin, 2000) and effects on business processes.

The final proposed research avenue with regard to workaround practices is knowledge management principles, and specifically the effects on knowledge workers that ERPs install. As was argued, an ERP is a control mechanism that manages the business processes in an integrated IS. A knowledge worker enacting technology is defined by the prescribed workflow designed into the system. In many instances this can hinder the creativity and desired enactment of the knowledge worker. Weske (2007) identified this in the BPM field. An analysis of workaround practices that knowledge workers enact in an organisation and the relationship with BPI are a further research area that requires attention.

5.7 Chapter Summary

The chapter provides a comprehensive conclusion of the empirical research conducted as part of this thesis. A summary of the findings was provided with an explanation of the investigation conducted at a large LGO. The interpretation of the findings that the research presented is addressed and a conclusion drawn. As a result, the implications that the research study offers the field were addressed, focussing on the core social issues experienced. Limitations and recommendations were provided according to the researcher's knowledge of the study and a section was devoted to future research that could be conducted to increase the knowledge of the field. This concludes the discussion on the limitations of the research conducted and its subsequent recommendations.

REFERENCES

- Alvarez, R. 2008. Examining technology, structure and identity during an Enterprise System implementation. *Information Systems Journal*, 18(2): 203-224.
- Askenäs, L., & Westelius, A. 2003. Five Roles of an Information System: A Social Constructionist Approach to Analysing the Use of ERP Systems. *Informing Science*, 6: 209-220.
- Auditor-General of South Africa. 2011. *Consolidated General Report on the Local Government Audit Outcomes 2009-10*: 1-161.
- Auditor-General of South Africa. 2012. *Consolidated General Report on the Audit Outcomes of Local Government 2010-11*: 1-70.
- Avison, D., & Fitzgerald, G. 2006. *Information Systems Development: methodologies, techniques & tools*. Berkshire: McGraw-Hill Education Limited.
- Azad, B., & King, N. 2008. Enacting computer workaround practices within a medication dispensing system. *European Journal of Information Systems*, 17: 264-278.
- Babbie, E., & Mouton, J. 2001. *The Practice of Social Research*. Cape Town: Oxford University Press.
- Beaudry, A., & Pinsonneault, A. 2005. Understanding User Response to Information Technology: A Coping Model of User Adaptation. *MIS Quarterly*, 29(3): 493-524.
- Bernroider, E., & Kock, S. 2001. ERP selection process in midsize and large organizations. *Business Process Management Journal*, 7(3): 251-257.
- Boritz, J. E. 2005. IS practitioners' views on core concepts of information integrity. *International Journal of Accounting Information Systems*, 6(4): 260-279.
- Boudreau, M. C., & Robey, D. 2005. Enacting Integrated Information Technology : A Human Agency Perspective. *Organization Science*, 16(1): 3-18.
- Bui, Y. 2009. *How to Write a Master's Thesis*. Thousand Oaks: SAGE Publications, Inc.
- Castells, M. 2000. *The Rise of the Network Society*. Oxford: Blackwell Publishers Ltd.

- Checkland, P. 2001. Soft Systems Methodology, in Rosenhead, J. & Mingers, J. (eds.). *Rational Analysis for a Problematic World Revisited: Problem Structuring Methods for Complexity, Uncertainty and Conflict*. New York: John Wiley & Sons, LTD. 61-87.
- Checkland, P., & Holwell, S. 2005. *Information, Systems and Information Systems: making sense of the field*. West Sussex: John Wiley & Sons, Ltd.
- Clegg, S., Courpasson, D., & Phillips, N. 2006. *Power and Organizations*. London: SAGE Publications, Inc.
- Cook, S., & Brown, J. 1999. Bridging Epistemologies: The Generative Dance Between Organizational Knowledge and Organizational Knowing. *Organization Science*, 10(4): 381-400.
- Creswell, J. W. 2009. *Research Design: Qualitative, quantitative and mixed methods approaches*. 3rd Edition. California: SAGE Publications, Inc.
- Davenport, T. 2000. *Mission Critical: Realising the promise of enterprise systems*. Massachusetts: Harvard Business School Press.
- DeLone, W. H., & McLean, E. R. 1992. Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research*, 3(1): 60-95.
- DeLone, W. H., & McLean, E. R. 2003. The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, 19(4): 9-30.
- DeSanctis, G., & Poole, M. 1994. Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organizational Science*, 5(2): 121-147.
- Eisenhardt, K., & Martin, J. 2000. Dynamic Capabilities: What are they? *Strategic Management Journal*, 21(10): 1105-1121.
- Ferneley, E. H., & Sobreperéz, P. 2006. Resist, comply or workaround? An examination of different facets of user engagement with information systems. *European Journal of Information Systems*, 15(4): 345-356.
- Feldman, M., & Irvine, U. 2008. Issues in Empirical Field Studies of Organisational Routines in Becker, M. (eds.). *Handbook of Organisational Routines*. Cheltenham: Edward Elgar Publishing Limited. 281-300.

- Feldman, M., & Pentland, B. 2003. Reconceptualizing Organizational Routines as a Source of Flexibility and Change. *Administrative Science Quarterly*, 48(1): 94-118.
- Feldman, M., & Pentland, B. 2007. Narrative Networks: Patterns of Technology and Organization. *Organization Science*, 18(5): 781-795.
- Friedman, T. 2006. *The World is Flat*. London: Penguin Books.
- Gebauer, J., & Schober, F. 2006. Information System Flexibility and the Cost Efficiency of Business Process. *Journal of the Association for Information Systems*, 7(3): 122-147.
- Goodhue, D. L., & Thompson, R. L. 1995. Task-Technology Fit and Individual Performance. *Management Information Systems*, 19(2): 213-236.
- Griffith, T. L. 1999. Technology Features as Triggers for Sensemaking. *The Academy of Management Review*, 24(3): 472-488.
- Halbesleben, J., Wakefield, D., & Wakefield, B. 2008. Work-arounds in health care settings: Literature review and research agenda. *Health Care Management Review*, 33(1): 2-12.
- Hanseth, O., Ciborra, C., & Braa, K. 2001. The Control Devolution: ERP and the Side Effects of Globalization. *The DATA BASE for Advances in Information Systems*, 32(4): 34-46.
- Hayes, N. 2000. Work-arounds and Boundary Crossing in a High Tech Optronics Company: The role of co-operative workflow technologies. *Computer Supported Cooperative Work (CSCW)*, 9: 435-455.
- Hofstede, G. 2001. *Culture's Consequences: Comparing Values, Behaviours, Institutions and Organizations Across Nations*. Thousand Oaks: SAGE Publications, Inc.
- Hong, K., & Kim, Y. 2002. The critical success factors for ERP implantation: an organisational fit perspective. *Information & Management Journal*, 40(1): 25-40.
- Ignatiadis, I., & Nandhakumar, J. 2009. The Effect of ERP System Workarounds on Organizational Control: An interpretivist case study. *Scandinavian Journal of Information Systems*, 21(2): 59-90.
- Jackson, M. C. 2003. *Systems Thinking: Creative Holism for Managers*. West Sussex: John Wiley & Sons Ltd.

- Jackson, M. H., Poole, M. S., & Kuhn, T. 2002. The social construction of technology in studies of the workplace, in Lievrouw, L. & Livingstone, S. (eds.). *Handbook of new media: Social shaping and consequences of ICTs*. London: SAGE Publications, Inc. 236-253.
- Jang, W., Lin, C., & Pan, M. 2004. Business strategies and the adoption of ERP: Evidence from Taiwan's communications industry. *Journal of Manufacturing Technology Management*, 20(8): 1084-1098.
- Jones, M. R., & Karsten, H. 2008. Giddens's Structuration Theory and Information Systems Research. *MIS Quarterly*, 32(1): 127-157.
- Kallinikos, J. 2004. Deconstructing information packages: Organizational and behavioural implications of ERP systems. *Information Technology & People*, 17(1): 8-30.
- Kanellis, P., Lycett, M., & Paul, R. J. 1999. Evaluating business information systems fit: from concept to practical application. *European Journal of Information Systems*, 8(1): 65-76.
- Karimi, J., Somers, T., & Bhattacharjee, A. 2007. The Impact of ERP implementation on Business Process Outcomes: A Factor-Based Study. *Journal of Management Information Systems*, 24(1): 101-134.
- Karimi, J., Somers, T., & Bhattacharjee, A. 2007. The Role of Information Systems Resources in ERP Capability Building and Business Process Outcomes. *Journal of Management Information Systems*, 24(2): 221-260.
- Klaus, H., & Gable, G. 2000. Senior managers' understanding of knowledge management in the context of enterprise systems. *Proceedings of the Sixth Americas Conference on Information Systems*, 981-987.
- Koopman, P., & Hoffman, R. R. 2003. Work-arounds, Make-works and Kludges. *IEEE Transactions on Intelligent Systems*, 18(6): 70-75.
- Laukkanen, S., Sarpola, S., & Hallikainen, P. 2005. ERP System Adoption – Does the Size Matter? *Proceedings of the 38th Hawaii International Conference on System Sciences*, 1-9. Hawaii.
- Law, C., & Ngai, E. 2007. ERP system adoption: An exploratory study of the organizational factors and impacts of ERP success. *Information & Management Journal*, 44(1): 418-432.

- Le Roux, D. B., & Le Roux, G. 2010. People Frames: The Social Construction of Information Systems. *Proceedings of the 2010 Symposium on Computer-Human Interaction for Management of Information Technology*, 1-9. San Jose.
- Lee, Z., & Lee, J. 2010. An ERP implementation case study from a knowledge transfer perspective. *Journal of Information Management*, 15(4): 281-288.
- Lengnick-Hall, C., Lengnick-Hall, M., & Abdinnour-Helm, S. 2004. The role of social and intellectual capital in achieving competitive advantage through Enterprise Resource Planning (ERP) systems. *Journal of Engineering and Technology Management*, 21(1): 307-330.
- Luhmann, N. 2000. Familiarity, Confidence, Trust: Problems and Alternatives, in Gambetta, D. (eds.). *Trust: Making and Breaking Cooperative Relations*. Oxford. 94-107. [Online]. Available: <<http://www.sociology.ox.ac.uk/papers/luhmann94-107.pdf>> [2012, October 18].
- Memela, S., Mautjane, B., Nzo, T., & Van Hoof, P. 2008. *The State of Local Governance in South Africa: What does the Local Governance Barometer tell us?:* 1-16. Pretoria: Idasa Publishing.
- Miles, M., & Huberman, A. M. 1994. *Qualitative Data Analysis*. 2nd Edition. California: SAGE Publications, Inc.
- Monk, E., & Wagner, B. 2013. *Concepts in Enterprise Resource Planning*. Massachusetts: Course Technology Cengage Learning.
- Morgan, G. 2006. *Images of Organisations*. California: SAGE Publications, Inc.
- Morton, N., & Hu, Q. 2008. Implications of the fit between organizational structure and ERP: A structure contingency theory perspective. *International Journal of Information Management*, 28: 391-402.
- Nah, F., Lau, J., & Kuang, J. 2001. Critical factors for successful implementation of enterprise systems. *Business Process Management Journal*, 7(3): 285-296.
- Nelson, R., & Winter, S. 1982. *An Evolutionary Theory of Economic Change*. Cambridge: Harvard University Press.
- Newell, S., Robertson, M., Scarbrough, H., & Swan, J. 2009. *Managing Knowledge Work and Innovation*. 2nd Edition. Hampshire: Palgrave Macmillan.

- Nonaka, I. 1994. A Dynamic Theory of Organizational Knowledge Creation. *Organizational Science*, 5(1): 14-37.
- Orlikowski, W. 1992. The Duality of Technology: Rethinking the Concept of Technology in Organizations. *Organizational Science*, 3(3): 398-427.
- Orlikowski, W., & Gash, D. 1993. Technological Frames: Making Sense of Information Technology in Organizations. *ACM Transactions on Information Systems*, 12(2): 174-207.
- Petrick, J., & Quinn, J. 2000. The Integrity Capacity Construct and Moral Progress in Business. *Journal of Business Ethics*, 23(1): 3-18.
- Phillips, J., Klein, G., & Sieck, R. 2004. Fast and Frugal Heuristics: The Tools of Bounded Rationality, in Koehler, D., & Harvey, N. (eds.). *Blackwell Handbook of Judgement and Decision Making*. Oxford: Blackwell Publishing Ltd. 297-315.
- Podeswa, H. 2009. *The Business Analysis Handbook*. Boston: Course Technology CENGAGE Learning PTR.
- Podeswa, H. 2010. *UML for the IT Business Analyst*. 2nd Edition. Boston: Thomson Course Technology PTR.
- Pollock, N. 2005. When Is a Work-Around? Conflict and Negotiation in Computer Systems Development. *Science, Technology & Human Values*, 30(4): 496-514.
- Poole, M., & DeSanctis, G. 2004. Structuration Theory in Information Systems Research: Methods and Controversies, in Whitman, M., & Woszczynski, B. (eds.). *Handbook for Information Systems Research*. Hershey: Idea Group Publishing. 206-249.
- Pozzebon, M., & Pinsonneault, A. 2005. Challenges in Conducting Empirical Work Using Structuration Theory: Learning from IT Research. *Organizational Studies*, 26(9): 1353-1376.
- Republic of South Africa. 1996. *Constitution of the Republic of South Africa No. 108 of 1996*. Pretoria.
- Republic of South Africa. 1998. *Local Government: Municipal Structures Act, No. 117 of 1998*. Government Gazette no. 19614, 18 December.
- Republic of South Africa. 2000. *Preferential Procurement Policy Framework Act, No. 5 of 2000*. Government Gazette no. 20854, 3 February.

Republic of South Africa. 2003. *Local Government: Municipal Finance Management Act, No. 56 of 2003*. Pretoria: Government Printer.

Republic of South Africa. Department of Cooperative Governance and Traditional Affairs. 2009. *State of Local Government in South Africa: Overview Report*. Working Documents COGTA: 1-89.

Sia, S., Tang, M., Soh, C., & Boh, W. 2002. Enterprise Resource Planning (ERP) systems as a technology of power: empowerment or panoptic control? *The DataBase for Advances in Information Systems Management*, 33(1): 23-37.

Sia, S. K., & Soh, C. 2007. An assessment of package–organisation misalignment: institutional and ontological structures. *European Journal of Information Systems*, 16(5): 568-583.

Soh, C., Kien, S. S., & Tay-yap, J. 2000. Cultural Fits and Misfits: Is ERP a Universal Solution? *Communications of the ACM*, 43(4): 47-51.

Soh, C., & Sia, S. 2004. An Institutional Perspective on Sources of ERP Package-Organisation Misalignments. *The Journal of Strategic Information Systems*, 13(4): 375-397.

Spradley, J. 1979. *The Ethnographic Interview*. Fort Worth: Harcourt Brace Jovanovich College Publishers.

Stefanou, C. 2000. The Selection Process of Enterprise Resource Planning (ERP) Systems. *AMCIS 2000 Proceedings*, 988-991.

Strong, D. M., & Volkoff, O. 2010. Understanding Organizational-Enterprise System Fit: A Path to Theorizing the Information Technology Artifact. *MIS Quarterly*, 34(4): 731-756.

Swan, J., Newell, S., & Robertson, M. 1999. The Illusion of “best practice” in Information Systems for Operations Management. *European Journal of Information Systems*, 8: 284-293.

Umble, E., Haft, R., & Umble, M. 2003. Enterprise Resource Planning: Implementation procedures and critical success factors. *European Journal of Operations Research*, 146(1): 241-257.

Verville, J., Bernadas, C., & Halington, A. 2005. So you’re thinking of buying an ERP? Ten critical factors for successful acquisitions. *Journal of Enterprise Information Management*, 18(6): 665-677.

Verville, J., & Halington, A. 2002. A six-stage model of the buying process for ERP software. *Industrial Marketing Management*, 32(1): 585-594.

- Wand, Y., & Weber, R. 1995. On the Deep Structure of Information Systems. *Information Systems Journal*, 5(3): 203-223.
- Wang, E., & Chen, J. 2006. Effects of internal support and consultant quality on the consulting process and ERP system quality. *Decision Support Systems*, 42(2): 1029-1041.
- Wei, C., Chien, C., & Wang, M. 2005. An AHP-based approach to ERP system selection. *International Journal of Production Economics*, 96(1): 47-62.
- Weick, K. E. 1995. *Sensemaking in Organisation*. California: SAGE Publications, Inc.
- Weske, M. 2007. *Business Process Management: Concepts, Languages, Architectures*. Berlin: Springer-Verlag.
- Wieder, B., Booth, P., Matolcsy, Z., & Ossimitz, M. 2006. The impact of ERP systems on firm and business process performance. *Journal of Enterprise Information Management*, 19(1): 13-29.
- Winter, S., & Szulanski, G. 2000. Replication of Organizational Routines: Conceptualizing the Exploitation of Knowledge Assets, in Choo, C., & Bontis, N. (eds.). *The Strategic Management of Intellectual Capital and Organizational Knowledge*. Oxford: Oxford University Press. 207-221.
- Yen, T., Idrus, R., & Yusof, U. 2011. A Framework for Classifying Misfit Between Enterprise Resource Planning (ERP) Systems and Business Strategies. *Asian Academy of Management Journal*, 16(2): 53-75.
- Yin, R. K. 2009. *Case Study Research: Design and Methods*. 4th Edition. California: SAGE Publications, Inc.
- Zhu, Y., Li, Y., Wang, W., & Chen, J. 2010. What leads to *post-implementation* success of ERP? An empirical study of the Chinese retail industry. *International Journal of Information Management*, 30(1): 265-276.

Appendix A

<i>Unit</i>	<i>Role</i>	<i>Interview ID</i>	<i>Remarks</i>	<i>Description Code</i>
Director	Information Systems	1 / 29	Informal Face-to-face Interview	Director (a)
	Supply Chain Management	2 / 29	Group Face-to-Face Interview	Director (b)
Procurement	Team Lead	1 / 19	Face-to-face Interview	Team Lead (a)
	Team Lead	2 / 46	Group Face-to-face Interview	Team Lead (b)
	Buyer	1 / 17	Face-to-face Interview	Buyer (a)
	Buyer	1 / 24	Face-to-face Interview	Buyer (b)
	Buyer	1 / 9	Face-to-face Interview	Buyer (c)
	Buyer	1 / 26	Face-to-face Interview	Buyer (d)
	Buyer	1 / 15	Face-to-face Interview	Buyer (e)
	Assistant Buyer	1 / 13	Face-to-face Interview	Assistant Buyer (a)
	Assistant Buyer	1 / 21	Face-to-face Interview	Assistant Buyer (b)
	Assistant Buyer	1 / 39	Face-to-face Interview	Assistant Buyer (c)
	Assistant Buyer	1 / 17	Face-to-face Interview	Assistant Buyer (d)
	Assistant Buyer	1 / 17	Face-to-face Interview	Assistant Buyer (e)
	Supplier Management	Head	1 / 41	Face-to-face Interview
Clerk 3		1 / 13	Face-to-face Interview	Clerk 3 (a)
Clerk 3		1 / 11	Face-to-face Interview	Clerk 3 (b)

<i>Unit</i>	<i>Role</i>	<i>Interview ID</i>	<i>Remarks</i>	<i>Description Code</i>
Tenders	Professional Officer	2 / 18	Group Face-to-face Interview	Professional Officer (a)
	Support Staff			Support Staff (a)
	SCM Practitioner	1 / 12	Face-to-face Interview	SCM Practitioner (a)
	Admin Officer 3	1 / 19	Face-to-face Interview	Admin Officer 3 (a)
	Admin Officer 1	1 / 11	Face-to-face Interview	Admin Officer 1 (a)
	Admin Officer 1	1 / 13	Face-to-face Interview	Admin Officer 1 (b)
	Clerk 2	1 / 13	Face-to-face Interview	Clerk 2 (a)
	Clerk 2	1 / 5	Face-to-face Interview	Clerk 2 (b)
	Clerk 3	1 / 23	Face-to-face Interview	Clerk 3 (a)
ERP Team	ERP Consultant	3 / 44	Group Face-to-face Interview	ERP Consultant (a)
	Supply Chain Management			Supply Chain Management (b)
	Engineer			Engineer (c)

Interview ID representation:

- Number of people present in the interview / Duration of the interview in minutes.

Appendix B

CODE KEY	Code	Specific Instances Identified	Literature Theory of Recognised Misfits/Workarounds
Misfits			
	[MI]	Impositions	Strong & Volkoff
	[MD]	Deficiency	Strong & Volkoff
Workarounds			
	[WEX]	Excel spread sheet/other software	External Systems – Ignatiadis & Nandhakumar
	[WDV]	Use of dummy variables	Data Manipulation – Ignatiadis & Nandhakumar
	[WPE]	Use of phone, email and walking	Verbal Signature Workaround – Azad & King
	[WNN]	Recognising numerical numbers	?
	[WBS]	Bypass certain steps	Fail-safe Workaround – Azad & King
	[WEM]	Emergency manual processes	Meta-workaround – Azad & King
	[WCR]	Changing roles	Concurrent Approval – Azad & King
Risks/Threats			
	[RCI]	Control issues & deviations	—
	[RAN]	Not using agreement number	—
	[RNU]	Little or no understanding	—
	[RIS]	Incorrect service orders discarded	—
	[RPA]	Policies speaking against each other	—
Deficiencies			
	[DSP]	Information not pulling through	Functionality Misfit – Strong & Volkoff
	[DSN]	Extra steps/screens not needed	Usability Misfit – Strong & Volkoff
	[DEA]	Employee absentee in the line	Functionality Misfit – Strong & Volkoff
	[DNP]	Non-agreement with policy	Control Misfit – Strong & Volkoff
	[DES]	Emergency situations	Control Misfit – Strong & Volkoff
	[DDC]	Duplications of contracts	Functionality Misfit – Strong & Volkoff
Impositions			
	[IMS]	Multiple screens/steps to enter data	Usability Misfit – Strong & Volkoff
	[IHS]	Hampering service delivery time	Control Misfit – Strong & Volkoff
	[IAN]	Agreement number	Data Misfit – Strong & Volkoff
	[INF]	Not aware of functions	Role Misfit – Strong & Volkoff
	[ICD]	Commodity differentiation	Usability Misfit – Strong & Volkoff
	[IMR]	Mass release of contracts - managers	Functionality Misfit – Strong & Volkoff