

**Impact of data quality on utilisation and usefulness of integrated Human Resources
Information Systems (HRIS)**

A thesis submitted in fulfilment
of the requirements for the Master's degree in Information Technology (M.comm)
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by

**UNIVERSITY of the
WESTERN CAPE**
Khulekani Enoch Dlamini
(2725315)

Supervisor :
Degree of confidentiality : None

Dr James Kariuki Njenga
September 2012

Declaration

Hereby I, Khulekani Enock Dlamini, declare that *Impact of data quality on utilisation and usefulness of integrated Human Resources Information Systems (HRIS)* is my own original work and that all sources have been accurately reported and acknowledged, and that this document has not previously in its entirety or in part been submitted at any university in order to obtain an academic qualification.

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Khulekani Enock Dlamini

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***Impact of data quality on utilisation and usefulness of integrated Human Resources
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Khulekani Enock Dlamini

Key words

Enterprise Resource Planning (ERP), Human Resource Management, Strategic Human Resource Management, Strategic Information Systems, Human Resource Information Systems (HRIS)



Abstract

Impact of data quality on utilisation and perceived usefulness of integrated Human Resources Information Systems (HRIS).

Integrated HR Information systems have become prevalent in modern organisations. These systems promise operational efficiencies and competitive advantage. In order to deliver these benefits, the systems should be effectively utilised and perceived as a useful business tools. The utilisation and perceived usefulness of the HRIS could be influenced by quality of data it produces.

The objective of this study was to investigate the impact of data quality on the utilisation and usefulness of the HRIS. The aim was to ensure that organisations realise their investments in HRIS. This would be achieved by improving qualities that ensures effective utilisation of HRIS. Moreover, the study sought to enhance the body of academic knowledge in HRIS as far data quality is concerned.

Mixed research method was used to meet the objectives of the study. Survey research and qualitative interviews techniques were employed. Statistical and deductive analysis was applied to raw data in order to draw conclusions.

The study found that data quality positively influence utilisation and usefulness of HRIS. Moreover, findings revealed that the HRIS was predominantly used for operational, rather than strategic tasks. HRIS data is also not generally perceived to be of poor quality. HR practitioners emphasise accuracy over other quality dimensions.

Organisations that seek to maximise their investment in HRIS should implement data quality improvement initiatives. This will ensure that the system is effectively utilised and produces high quality information for decision-making. This could lead to competitive advantage. Further research could be undertaken to understand; success factors for HRIS data quality initiatives, determinants of HRIS user satisfaction, drivers for dedicated HRIS management roles and the impact of having HRIS manager among others.

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List of acronyms

Acronym	Description
BI	Business Intelligence
BIW	Business Information Warehouse
CEO	Chief Executive Officer
CIO	Chief Information Officer
CRM	Customer Relationship Management
CSV	Comma-Separated Values
D&M	DeLone and McLean
DQ	Data Quality
DQM	Data Quality Management
e-HRM	Electronic Human Resources Management
ERP	Enterprise Resource Planning
HCM	Human Capital Management
HR	Human Resources
HRIS	Human Resources Information System
HRM	Human Resources Management
IP	Information Products
IS	Information System
IT	Information Technology
KPI	Key Performance Indicator
MIS	Management Information System
QUAL	Qualitative/Data quality
QUAN	Quantitative
RBV	Resource Based View
SAP	Systems, Applications, Products
SCM	Supply Chain Management
SERV	Satisfaction with HRIS IT services
SHRM	Strategic Human Resources Management
SLA	Service Level Agreement
TAM	Technology Acceptance Model
TCO	Total Cost of Ownership
TDQM	Total Data Quality Management

Acronym	Description
THRM	Traditional Human Resources Management
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UIS	User Information Satisfaction
USEF	Perceived HRIS Usefulness
UTAUT	Unified Theory of Acceptance and Use of Technology
UTIL	Perceived HRIS Utilisation
UWC	University of Western Cape

Index of formulae

(a) Cronbach's coefficient alpha

$$\alpha = \frac{n}{n-1} \left(1 - \frac{\sum Vi}{V_{test}} \right)$$



Formula 3-1: Cronbach's coefficient alpha

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(b) Pearson's correlation coefficient.

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

Formula 4-1: Pearson's correlation coefficient.

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1 Chapter 1: Study background

1.1 Introduction

Chief Information Officers (CIOs) are constantly asked to cut their budgets and achieve more with fewer resources (Gartner, 2010; Al-adaileh, 2009). Human Resources departments are also under pressure to recruit skilled resources while containing costs. Consequently, HR technology budgets often fall victim to such cost containment initiatives (Shani and Tesone, 2010). Therefore, it is important that HR and IT provide a convincing business case for investment in HRIS. One of the key drivers for HRIS investments has been found to be information quality, among others (Troshani, Jerram & Hill, 2011; Boateng, 2007). This study was undertaken to explore the influence data quality has on system utilisation and perceived usefulness.

This chapter presents study background and research objectives. Literature overview is provided, highlighting theoretical foundations and possible gaps in HRIS research. Scope and limitations of the study are discussed, thus indicating applicable parameters. The layout and flow of the research is graphically illustrated and discussed. The chapter concludes with a summary and a brief introduction of the ensuing chapter.

1.2 Nature of the study

The role of Information Technology (IT) in organisational strategy execution and performance has been found to be critical in modern business environments (Keramati, 2007). The existence of IT-dependent business models such as electronic commerce (e-commerce) is evidence of the importance of technology in organisations (Porter, 2001).

Human Resources (HR) departments have been regarded by some as late adopters of IT (Kossek, Young, Gash, & Nichol, 1994). However, this seems to have changed, partly due to introduction of concepts such as, but not limited to Strategic Human Resource Management (SHRM), Human Capital Management (HCM), electronic Human Resource Management (e-HRM) and Talent Management (Ruel, Bondarouk & van der Meyde, 2007). Modern HR departments utilise integrated Human Resource Information Systems (HRIS) to effectively manage talent so as to meet organisation's strategic objectives (Voermans & Veldhiven, 2007).

Organisations invest significant resources to implement and operate HRIS. HRIS benefits should therefore be consistently realised in order to justify investment decisions (Stratman, 2007). The value and success of Information Systems such as HRIS have been found to be linked to the quality of data it provides for decision-making purposes (Kovac & Cathcart, 1999). In addition, Information Systems (IS) success theories imply that the system should be continuously used in order to realise benefits (Wu & Wang, 2006). Continued usage could be influenced by, amongst other factors; perceived quality of data it provides and perceived usefulness of the system (Hong, Kim & Lee, 2008).

Steps could therefore be taken to improve factors that might positively influence HRIS usage such as but not limited to data quality. These steps could increase possibilities of realising anticipated benefits (Williams, 1997). This study evaluates the impact of data quality on HRIS utilisation, perceived usefulness at South African organisations. The study also aims to advance body of knowledge in HRIS research. Moreover, findings could assist organisations realise value from HRIS by improving factors that could lead to system success.

1.3 Background to research problem

Business stakeholders' expectations put pressure on HR to play a strategic role while maintaining operational efficiency (Ulrich, 1997). This pressure seems to have motivated HR managers to demand IT solutions that support business processes from beginning to end (Ball, 2001). HR managers are realising that; to be effective, HR should break down functional silos and use integrated technologies that leverage a common set of competency data and a consistent user experience (Holincheck, 2005).

Pressures on HR emanate from the realisation that people are a strategic asset of the organisation (Aberdeen Group, 2007). The shortage of this asset could significantly affect survival of the organisation. The HR function therefore warrants proper management through technologies that support business processes and decision making (Boateng, 2007). Enterprise Resource Planning (ERP) offers a suite of applications that support end-to-end business processes. ERP systems are configurable, commercial software packages that integrate organizational data resources into a unified system (Davenport, 1998).

The HR subsystem of ERP applications is known as the Human Resources Information System or HRIS, (Kovach *et al*, 2002). The HRIS is defined as a system used to acquire, store, manipulate, analyze, retrieve and distribute pertinent information about an organisation's human resources (Mehmood, Zafa & Khan, 2008; Ngai & Wat, 2004). ERP systems are relatively expensive hence there should overriding business reasons for their purchase (Stratman, 2007).

Reasons for ERP adoption, amongst others, are cross-functional integration of business processes, information sharing, operational efficiencies, strategy execution, consolidation of organisational reports (Laukkanen, Sarpola & Hallikainen, 2002). ERP systems were initially adopted by large organisations where such reasons are applicable (Al-Mashari, 2002). ERP were traditionally prevalent in large organisations due to their high implementation costs (Scapens, Jazayeri & Scapens, 1998). However, ERP vendors have developed ERP solutions tailored to medium-size enterprises (Muscatello & Chen, 2008).

Like any business investment, ERP systems should consistently justify expenditure (Clemons & Gu, 2002). ERP return on investment could be directly linked to the success of the system in the context of the organisation's strategic objectives (Stratman, 2007). Modern information systems success is defined and measured using diverse models. IS success models have evolved over time through academic research and debate (Sabherwal, Jeyaraj & Chowa, 2006).

Origins of modern IS success models could be traced to IT adoption theories such as Technology Acceptance Model (TAM), 3-D model, Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA) and Unified Theory of Acceptance and Use of Technology (UTAUT) amongst others (Sabherwal, Jeyaraj & Chowa, 2006). These theories approached success from a generic perspective. For example, a generic study would explore user perceptions of internet-based applications.

IS success has also been approached from the perspective of the system type (Figure 1-1). For example, system-type approach would explore user perceptions of e-commerce, e-recruiting, electronic banking systems, instead of studying general perceptions of internet applications. Moreover, such a study could focus on, point of sale, transaction processing, decision support, enterprise system (ERP), among others (Wu & Wang, 2006; Yu, 2005).

Enterprise systems are further approached from a functional perspective such as finance, supply chain, manufacturing, human resource, among others (Boateng, 2007; Davenport & Brooks, 2004). This study explored IS success from a functional perspective hence the focus on the HR component of ERP.

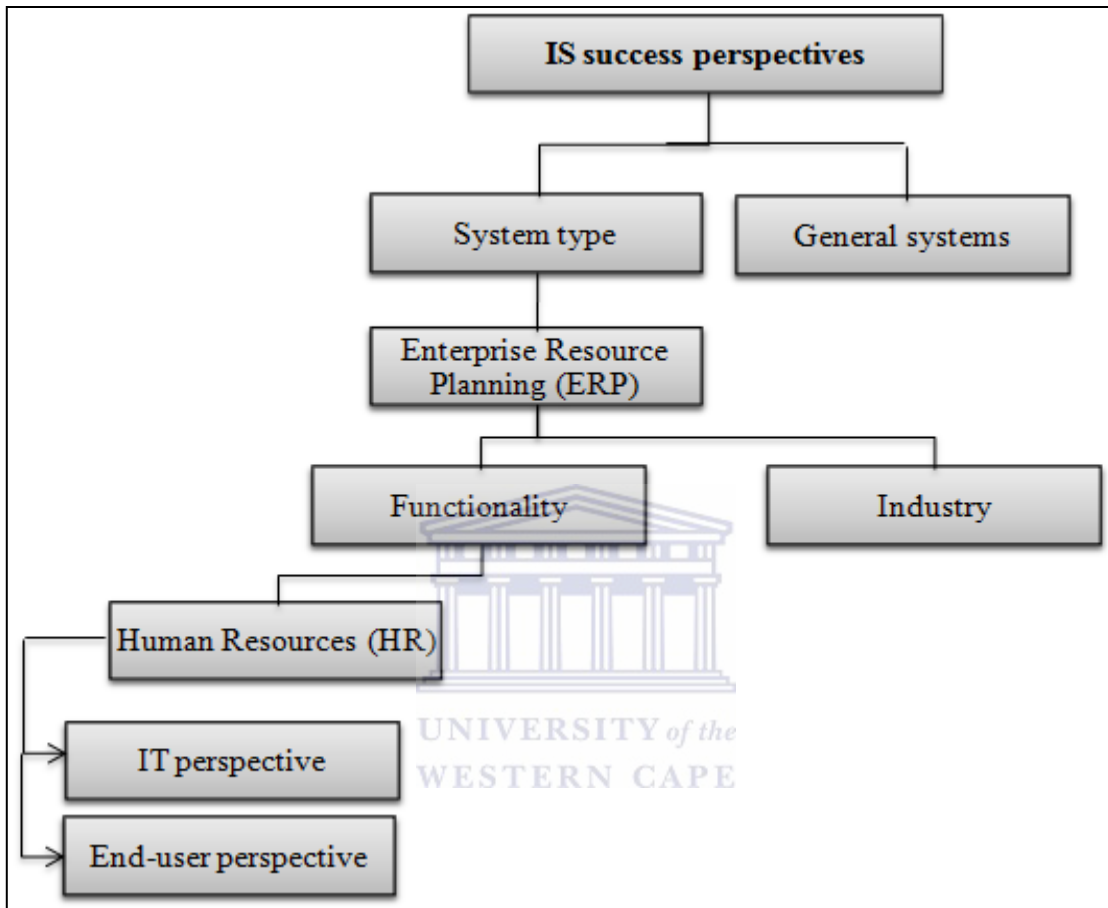


Figure 1-1: Approaches to IS success (source: author)

Common aspects of prevalent success models are system quality, information quality, utilisation, ease of use, usefulness and system impact (DeLone & McLean, 2003; Seddon, 1997). Figure 1-1 depicts that IS success is also measured from end-user and IT perspectives (Wu & Wang, 2007; Bokhara, 2005). The end-user perspective is based on what is known as User Information Satisfaction (UIS) theory. According to the UIS theory, a system is deemed successful if it satisfies information needs of the users (Wrigle, Drury & Farhoomand, 1997).

The IT perspective measures system qualities (DeLone & McLean, 2003). System qualities have been found to influence user attitudes towards the technology (Bokhara, 2005). End-user perspectives measure perceptions and experiences such as usability, usefulness, impact on individual tasks among others (Wu & Wang, 2007).

As far as ERP systems are concerned, business stakeholders are keen on evaluating whether system benefits justify capital investments (Wu & Wang, 2006). ERP software seem to have gained adoption on the premise that better information integration could provide competitive advantage (Robey, Ross & Boudreau, 2002; Esteves & Pastor, 2001). However, concrete business benefits have been uneven for adopters (Stratman, 2007). This phenomenon could be attributed, amongst other factors; to the different approaches to measuring IS success (Sabherwal *et al*, 2006).

Lack of consistent measures for ERP success, particularly in HRIS, could indicate the need for a suitable theoretical framework for such systems. The framework should consider, amongst other factors, information quality, continued system utilisation and usefulness (Ngai & Wat, 2004). An HRIS could therefore be viewed as successful if it provides quality data/information for decision making. Information quality has been found to be a determinant of continued IS utilisation and perceived system usefulness (Khalil & Elkordy, 2005; Almutairi & Subramanian, 2005).

Information quality, either perceived or actual, has been found to influence continued system usage and user satisfaction (Wu & Wang, 2006). System usage and user satisfaction are regarded as primary IS success measures, from the users' perspective (Hong *et al*, 2008; Medina & Chaparro, 2007). In addition, information is derived from raw data, thus asserting the case for data quality management (Lillrank, 2003). The terms data and information are used interchangeably by most researchers. However, for the purposes of this study, the term data quality implies information quality.

One of the international Human Resources IT survey companies, CedarCrestone (2008), notes that quality HR information cannot be overemphasized in modern business environment. This is due to the fact that globalisation, economic and social conditions diminish supply of critical skills. It is therefore important that management and practitioners have access to quality information in order to better manage human capital resources (Thomas, Skitmore & Sharma, 2001). The HRIS facilitates provision of information to meet this objective (Kovach, Hughes, Fagan & Maggitti, 2002).

The aim of this study was therefore to evaluate the impact of perceived data quality on usage and perceived usefulness of integrated HRIS. Such evaluation was deemed necessary in order to establish factors that could improve the value of HRIS to the user and organisation. The results of the study could also enable formulation of enterprise-wide HR data quality management frameworks. The frameworks could ensure consistent provision of quality HR data for administrative and strategic purposes (Medina & Chaparro, 2007).

Stvilia, Gasser, Twidale & Smith (2007) provided a point of reference for information quality, techniques and use. Although previous studies addressed data and information quality, they do not seem to focus on data quality as it is relevant to HRIS. Furthermore, a review of studies in HRIS revealed limited literature on data quality (Mehmood, Zafar & Khan, 2008; Mayfield, Mayfield & Lunce, 2003; Ball, 2001; Kovach & Cathcart, 1999). This served as a motivation for undertaking this study.

The aim of the study is to address inadequate HRIS research in general, while paying particular attention to data quality. Directions for further research are also highlighted (Bedell, Floyd, McGlashan Nicols & Ellis, 2007). This is expected to advance knowledge in the area of HR information technologies and their usefulness in organisations.

The strategic objective of this study was to increase awareness of HR data, as a strategic resource (Redman, 2005). Moreover, the study sought to ensure value realisation from HRIS. It suggested that data quality could be one of the factors that might increase the value added by HRIS (Levitin, 1998). Senior management in HR and IT should therefore devote resources to ensure quality of data and resultant information for compliance reporting and talent management (Vosburg & Kumar, 2001).

A comprehensive strategy for ensuring data and information quality is difficult, yet necessary (Sen, 2001). The findings and recommendations of this study could assist organisations in designing data quality management strategies. These strategies could build a foundation for analytical applications such as Business Information Warehouse (BIW), Business Intelligence (BI), Workforce analytics amongst others (Chaffey & Wood, 2005).

1.4 Research topic

The title of this study is:

The impact of data quality on utilisation and usefulness of integrated Human Resources Information Systems

Integrated HRIS represent significant financial investment hence their prevalence in large organisations (Boateng, 2007). Implementation of these systems shows a strategic intent to manage HR efficiently. Integrated systems pose data quality challenges both during implementation and post implementation (Xu, Nord, Brown & Nord, 2002). Post-implementation data quality challenges are exacerbated, amongst other factors, by multiple data entry points, geographical distance between users, multiple update points, unclear data quality responsibilities, lack of system validation rules (Vosburg & Kumar, 2001).

HR systems should prove to be a source of quality information in order to deliver sustainable business value and assert themselves as strategic tools (Bussler & Davis, 2002). An investigation of data that constitutes HR reports is necessary to ensure quality management information. This could be achieved through quality checks during data input, processing and output (Vosburg & Kumar, 2001).

The research statement of this study was; *Users of integrated HRIS do not perceive their data to be of high quality hence they do not optimally use the system. They therefore do not perceive it as a useful business tool that adds value to their jobs and the organisation at large.*

1.5 Research objectives

The aim of this study was to *evaluate the relationship between perceived data quality, utilisation and perceived usefulness of integrated Human Resource Information Systems (HRIS) in South Africa.*

The objective of the study was therefore to answer the following questions in the context of integrated HRIS:

- What is the relationship between perceived data quality and system utilisation?
- What is the relationship between utilisation and perceived usefulness of the system?
- What is the relationship between data quality, utilisation and perceived usefulness of the system?

The general perception of data quality in HRIS was investigated, thus providing theoretical foundation for this research. The study also sought to explore service quality and user satisfaction as determinants of continued HRIS usage. Furthermore, the study explored the influence of data quality on perceived individual and organisational impact of the HRIS. The objectives of this study are not deemed to be all-encompassing hence subsequent research could seek to address the following questions:

- Is there a relationship between HRIS data quality management processes and the success of Business Intelligence (BI) implementations for HR?
- What are the competencies are required in order to be a successful HRIS manager?
- What is the impact of an HRIS Manager in realising objectives of Strategic Human Resource Management (SHRM)?

1.6 The literature study

This study aimed to answer the question: *What is the impact of perceived data quality on the utilisation and perceived usefulness of integrated HRIS of large South African organisations?*

A higher percentage of literature consulted for the study was that published during and after year 2000. However, a limited number of relevant studies published prior to 2000 were also consulted. These older studies were utilised due to their relevance to the current research. The researcher also lacked access to recent studies where premium subscription was required to access recent publications. In instances where certain articles were requested, it took longer for these to reach the researcher hence available material was utilised.

The literature study explored the evolving role of the HR function in organisations. Studies show that HR has evolved from being administrative bodies to strategic business partners that is from Personnel Administration to Strategic Human Resource Management (SHRM). The objectives of SHRM and its link to organisational strategy and competitive advantage were studied (Ramlall, 2003; Buyens & Devos, 2001).

Having gained an appreciation of SHRM, the role of IT as an enabler of SHRM processes was explored. The focus was on ERP systems which underpin SHRM processes in large organisations (Kinnerly & Neely, 2001). Particular attention was devoted to integrated HRIS, a subset of the ERP solution. The literature study evaluated the broader concept of the usefulness of ERP-based HRIS in organisations, particularly from a data/information quality perspective.

Studies showed that the value of an Information System (IS) is related to its success, measured from the ultimate user's perspective. Various models such as Technology Acceptance Model, Theory of Reasoned Action and DeLone & McLean amongst others were explored (Wu & Wang, 2006). The intention was to establish a conceptual framework for evaluating the impact of HRIS data quality on utilisation and usefulness (Mayfield *et al*, 2003). Amongst other variables, IS models revealed that success is a function of the perceived quality of the information provided by the system (Sabherwal *et al*, 2006; DeLone & McLean, 2003; Seddon, 1997).

The concept of information quality was studied, in the context of its hierarchical nature. The hierarchy consists of data, information and knowledge (Checkland & Hollowell, 1998). In identifying the nature of information, the study described quality attributes of valuable information. The literature study enabled certain propositions to be formulated on the appropriate framework to be applied in this research (Williams, 2007). Figure 1-2 shows that it could be impossible to derive useful information on the basis of data that is of inferior quality.

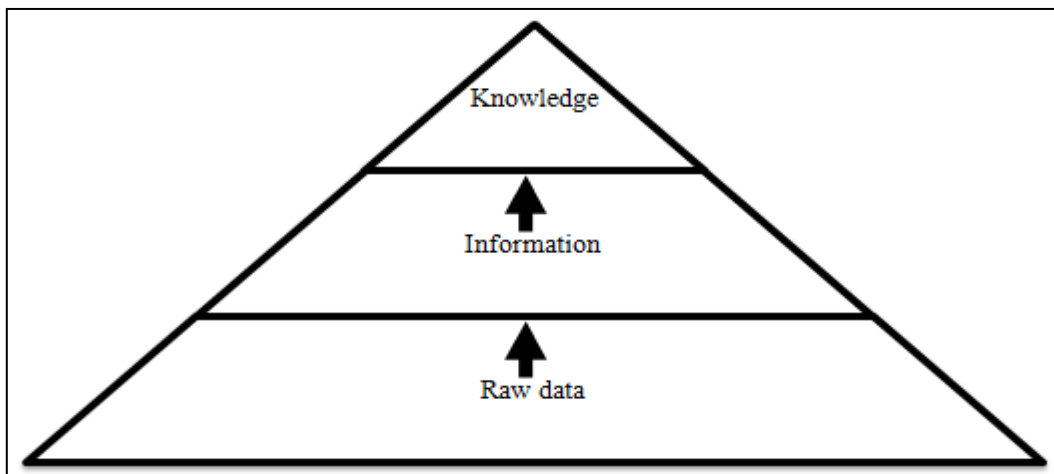


Figure 1-2: Information quality concept (Checkland and Hollowell, 1998).

The study concluded with a review of data quality as an integral part of the value provided by integrated systems (Kovach & Cathcart, 1999). This implied that quality data should provide a foundation for compliance reporting and analytics (Velcu, 2007). Translation of data into useful information is critical for operational and strategic decision making purposes (Kovach *et al*, 2002). However, literature study revealed that there is limited research that supports these statements in an HRIS environment. This realisation served as motivation for undertaking the current study.

1.7 Scope and limitations of the study

This study was confined to local and international organisations with operations in South African. Organisational size was restricted to public and private sector entities employing more than 250 employees. Latest and classical findings in academic literature and industry publications were incorporated into the study.

The study was limited to integrated HRIS that is a sub-function of an ERP system such as, but not limited to SAP, Oracle, PeopleSoft, Lawson, Eclipse, JD Edwards and Microsoft Dynamics. Low response rates were expected from companies whose head offices are distant from Gauteng province where the researcher was located during the study. Therefore, geographical location of the participating organisations will not be considered a significant variable in drawing conclusions.

The study focused on perceived data quality and usefulness. It therefore elicited opinions of HRIS users and IT resources, without validating these opinions with actual system data. User opinions were therefore deemed representative of what could be expected from actual data residing in the HRIS. A study that evaluates actual HRIS data could therefore yield results that are slightly or significantly different.

1.8 Layout of the dissertation

In order to achieve the objectives of the study, that is evaluate impact of data quality on utilisation and HRIS usefulness, the dissertation is structured as shown in figure 1-3. The figure shows that the study began by introducing the research topic. A theoretical framework was built from the works of DeLone and McLean (2003) as well as Gable, Sedera & Chan (2003). An appropriate, mixed method design was selected to approach the investigation. Data was collected and analysed to test the conformance or deviation from the theoretical framework. Conclusions were therefore drawn, based on the mixed method analysis of data sources.

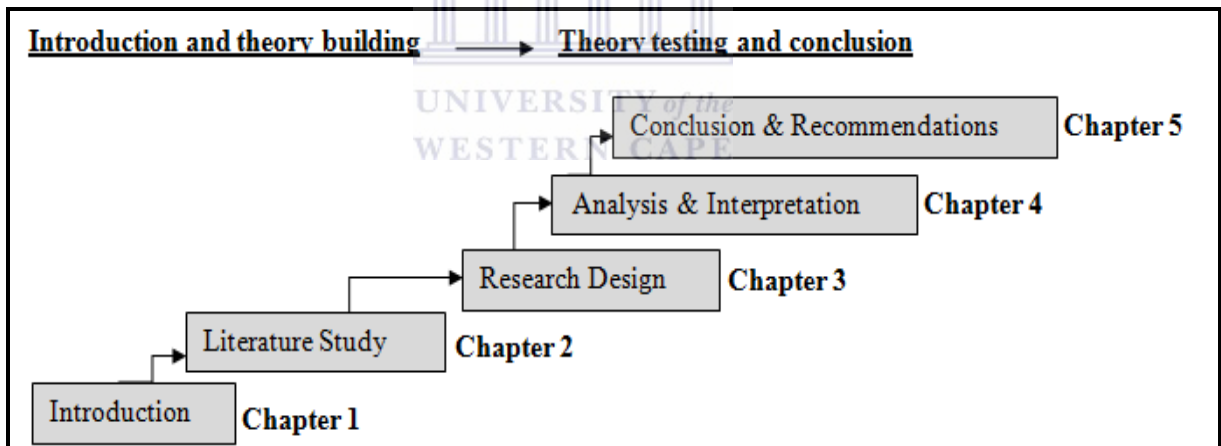


Figure 1-3: Study layout (source: author)

Chapter 2: Literature Study

This chapter reviews academic roots, logical arguments, components and measures relevant to the research topic. It concludes with a conceptual framework for exploring the impact of perceived data quality on HRIS utilisation and usefulness at South African organisations.

Chapter 3: Research design and Methodology

This chapter begins with a description of the research paradigm adopted to meet study objectives. Instruments to be used in data collection and the motivation thereof are also explained. Operational application of constructs, their validity, bias and reliability is discussed. A motivation for the selected target population is provided. Moreover, participation rules for inclusion in the study are provided. The chapter concludes with a description of the pilot study and empirical data gathering process.

Chapter 4: Findings and Analysis

In this chapter, empirical data is interpreted in the context of the study. Analysis begins with respondents' industry sector, role in HRIS, period in which HRIS has been in use and the HRIS product being used. Reliability of the survey instrument and empirical results are reviewed; statistical regression models are also explained. The relationship between data quality, utilisation and usefulness is explored on the basis of data collected.

Key factors influencing outcomes of the study are discussed. The chapter closes with a discussion of the findings on the perceived data quality in integrated HRIS at large SA organisations. Implications of data quality in HR are discussed. Further commentary is provided on key determinants of HRIS success in at large organisations.

Chapter 5: Conclusion and Recommendations

This chapter concludes with a review of research problem, construct development and empirical findings. Implications for management, study limitations and recommendations for further research are provided.

1.9 Chapter summary

This chapter introduced the background and context of the study. It covered the need for HRIS and most common reasons organisations adopt HRIS. The primary research objective was discussed as an effort to understand the impact of perceived data quality on utilisation and usefulness of integrated HRIS. Secondary objectives relating individual and organisational impact of the HRIS were also introduced.

Definitions such as Strategic Human Resource Management, Enterprise Resource Planning, Human Resources Information System, Information System Success, Data and Information Quality were discussed. The chapter concluded with a summary of the entire thesis by providing a logical structure of chapters and brief content explanations.

The next chapter (**Chapter 2** – Literature study) delves deeper into the concepts introduced here in order to build a theoretical framework for the study. The chapter builds a body of knowledge by analysing arguments and findings in current literature within the disciplines of Human Resources, Information Systems, Data Management and Information Science.



2 Chapter 2: Literature Study

2.1 Introduction

This study adopted a predominantly deductive research approach. In deductive research, a theoretical framework is built from existing literature and tested during the investigation (Denzin & Lincoln, 2000). In inductive research, the researcher sets out to build new theories from research data (Creswell, 2005). This study combined both approaches by testing existing models and looking for emerging theories from collected data. Chapter 3 (Research design) elaborates on this approach.

This chapter presents a review of past and recent academic literature consulted in building a theoretical framework. The main focus areas are Strategic Human Resources Management (SHRM), Information Technology (IT), Enterprise Resource Planning (ERP), Human Resources Information Systems (HRIS), Data Quality Management and Information Quality.

Disciplines such as Healthcare, Supply Chain Management (SCM), Finance and E-business were explored due to limited academic literature on HR data quality (Wang, 1998). The impact of data quality is however interpreted as it is relevant to HR Information Systems. The chapter closes with construction of a deductive framework that was used to guide the design and execution of the study.

2.2 Role of the Human Resource Management (HRM) function

Human Resource Management evolved from Personnel Management to Traditional Human Resource Management (THRM). These THRM functions were predominantly concerned with administrative duties for internal employees (Maxwell & Farquharson, 2008; Lawler & Mohrman, 2003). Due to globalisation, increased competition and volatile market conditions, researchers have been advocating for HR to play a more strategic role that would contribute to the achievement of competitive advantage (Wang & Shyu, 2007; Morley, Gunnigle, O'Sullivan & Collings, 2006). This gave rise to Strategic Human Resource Management or SHRM (Hoobler, 2004).

Strategic involvement of HR has been found to positively influence organisational performance (Boxall, 2003; Wang & Shyu, 2007). HR's strategic focus should however not be at the expense of administrative functions, which are also necessary in running the organisation. The HR department should therefore perform both roles in supporting organisational goals (Tracey & Nathan, 2002). This role includes workforce planning, recruitment, on-boarding, remuneration, development and service termination. This dual role of HR could be enabled through IT, in the form of an HRIS (Mayfield *et al*, 2003).

A review of eight (8) HRIS empirical studies by Ngai and Wat (2004) revealed that the role of IT in enabling HR does not seem to be adequately researched. There is acknowledgement of information availability as a key HRIS benefit. However, the impact of data quality in an IT-enabled HR function appears to be poorly understood. This study therefore sought to evaluate the impact of data quality in the context of administrative and strategic roles of HR. The focus was on the HRIS as a key enabler of HR business process execution (Boateng, 2007).

2.3 Strategic Human Resource Management (SHRM)

HR should consistently justify its existence by adding value to the organisation (Lawler, 2005). Resource-Based View (RBV) states that an organisation can create sustainable competitive advantage by creating value in a manner that is difficult for competitors to imitate (Barney, 1986). In exploring the relationship between SHRM and organisational performance (Chang & Huang, 2005) argued that since natural resources and production equipment are relatively easy for competitors to imitate, HR as a strategic asset could offer a source of competitive advantage.

2.3.1 SHRM and competitive edge

The HR function could provide competitive edge by identifying organisational needs and planning talent management initiatives to support the competitive strategy (Lawler, 2003). SHRM could therefore be seen as responsible for ensuring that competent resources are available at the right places and right times to execute corporate strategies with highest levels of quality (Khoong, 1996). However, the effectiveness of HR in meeting corporate objectives has been questioned, raising the debate of organisational "fit" between HR and business strategies (Lawler, 2005; Baker, 1999).

Proponents of organisational fit theory argue that for SHRM to be effective, it has to align with organisational strategy (Chang & Huang, 2005). The counter argument is that organisational strategy development is often evolutionary. This makes it difficult to continuously alter HR policies, processes, procedures and practices to align with evolving corporate strategies (Hoobler & Brown Johnson, 2004). Ramlall (2003) implied that competitive advantage could be achieved by a complex interrelationship between HR and other organisational components such as finance, IT and marketing, among others. According to Liao (2005), HR strategy is contingent on the business strategy and as such should be flexible to respond to internal and external forces.

2.3.2 SHRM and organisational performance

Despite the debate outlined above, researchers seem to agree that when HR and business strategies are aligned, organisational performance improves (Wang & Shyu, 2007; Teo & Crawford, 2005; Ramlall, 2003). For example, Wang & Shyu (2007) found that in companies where business and HR strategies were aligned, HR practices were more effective and organisational performance was better than those where there was misalignment. SHRM therefore seeks to align HR business processes, policies, procedures and technologies with organisational strategy in order to improve performance (Dimba, 2010; Teo & Crawford, 2005).

The ability of SHRM to improve organisational performance and create competitive advantage could be influenced by various factors (Truss, 2003). These factors could be policies, procedures, strategic alignment, political influences of HR directors, workforce skills; organisational design, efficient execution of HR plans, organisational culture and technology, to name but a few (Chang & Huang, 2005). Alignment between corporate and HR strategies has been found to have a strong influence on HR effectiveness (Lawler, 2005). Moreover, technology has been found to influence HR effectiveness (Ruel *et al*, 2007; Kovac & Cathcart, 1999). However, Sauer & Yetton (1997) warned that mere HR automation does not automatically improve effectiveness. HR automation should complement optimal business processes (CedarCrestone, 2009; Monks & McMackin, 2001).

Consequently, as the objective of SHRM is to achieve business goals, better alignment with organisational strategies is crucial. Moreover, technologies should enhance HR's potential to improve organisational performance and create sustainable competitive advantage (Wang &

Shyu 2007; Chang & Huang, 2005). Rapid access to quality information for key HR decisions could represent such competitive advantage (Redman, 1995). SHRM literature does not appear to adequately address the impact of data quality in HR technologies. The influence that data quality has on HR technology utilisation and perceived value (usefulness) is therefore worth exploring (Ramlall, 2003).

Broderick and Boudreau (1992) mapped value-adding technologies that could be used in SHRM, albeit without particular focus on data quality issues in HR technologies. User perceptions of data quality in HR technologies have not received necessary attention from scholars (Mehmood, Zafar & Khan, 2008). It is therefore necessary to study this phenomenon. The aim is to evaluate the impact of such perceptions on technology utilisation and usefulness. These perceptions could have an impact on SHRM's ability to improve organisational performance (Hong *et al*, 2008; Lawler, 2005; Chang & Huang, 2005).

2.4 SHRM and Information Technology (IT)

Modern organisations employ IT to execute operational and strategic objectives. The same can be said of HR functions within organisations (Mayfield, Mayfield & Lunce, 2003). Broderick & Boudreau (1992) argued that the HR function should match their computer applications to the strategic objectives they support. Boundarouk and Looise (2005) used three case studies to conclude that HR personnel were generally not actively involved in IT innovations at their organisations. HR has been found to be actively involved in IT innovations that are associated with a strategic role of HR. This seems to suggest that HR is keen on IT systems that accentuate their value to organisation (Jayasundara, 2003).

Technologies that provide valuable HR information are likely to receive attention from HR management and practitioners (Hosie, 1995). HR personnel require an information base that support business processes and practices of the HR function (Kovac *et al*, 2002). HRIS should therefore aim to integrate and support three essential corporate processes, namely strategic planning; operational planning; and human resource planning (Ball, 2001). Groe, Pyle and Jamrog (1996) predicted that HR will be dependent on integrated technologies to support complex organisations. Moreover, Ulrich (1997) identified IT as one area of HR practice that required investment, talent and resourcing. A study by Boateng (2007) revealed that the HR system plays a key role in enabling strategic HRM.

2.4.1 Driver for HRIS revolution

Drivers for HRIS revolution appear to be globalisation of business, development of flexible, non-traditional organisational structures, IT advancements and maturing of post World War II generation into senior management (Groe *et al*, 1996). Lawler (2003) confirmed the manifestation of these drivers in HR, particularly globalisation, technology advancement and complexity of modern organisations thus implying a strategic for the HRIS.

Kinnie and Arthurs (1996) used the model developed by Broderick & Boudreau (1992) to concluded that the most prevalent use of IT within the HR function at the time was limited to payroll and records management. This finding could be attributed to lack of knowledge about the potential of IT which restricted HR from realising HRIS benefits (Tansley, Newell & Williams, 2001). A study of IT utilisation by Ball (2001) revealed that IT was used for administrative purposes. This phenomenon appears to change, probably due to introduction of internet technologies (Ngai & Wat, 2004).

Evolution of the internet as a business tool is gradually permeating the HR function. Studies show that an electronic HRM information system (e-HRM) enhances the effectiveness of the HR function (Ruel *et al*, 2007; Panayotopoulou, Vakola & Galanaki, 2007; Voermans & Veldhoven, 2007). E-HRM is defined as the administrative support of the HR function in organizations by using internet technology (Voermans & van Veldhoven, 2007)

HR technology adoption seems to be driven by the need for the HR function to play a strategic role in the organisation. This could be achieved by automating routine tasks while facilitating an integrated approach to talent management (Boateng, 2007). An integrated HRIS enables effective SHRM to influence organisational performance (Wright, McMahan, Snell & Gerhart, 2001; Lawler & Mohrman, 2003).

2.4.2 HRIS value realisation

The full potential of HRIS does not seem to be realised. This could be ascribed lack of understanding of conditions that precede HRIS value realisation (Tansley *et al*, 2001; Ngai & Wat, 2004). In their study, Haines and Petit (1997) categorised these conditions into Individual/Task, Organisational and System conditions. They found that system conditions were most important determinants of HRIS success. System usefulness was also tested, without exploring its antecedents.

HRIS is critical in enabling effective SHRM and influence organisational performance (Lawler & Mohrman, 2003; Tansley *et al*, 2001). However studies have not fully explored the pre-conditions for HRIS to improve SHRM effectiveness. The impact of perceived data quality on utilisation and usefulness of HRIS does not appear to be adequately researched. This study can therefore be viewed as an expansion on the preconditions for successful HRIS explored by Haines and Petit (1997). The emphasis is on the influence of perceived data quality on system usage and usefulness.

2.5 HRIS in Enterprise Resource Planning (ERP)

The concept of an integrated HR system could be traced to general systems theory as opposed to Information Systems (Ngai & Wat, 2004). The concept integrates aspects of strategic planning, recruitment, assessment, remunerations & rewards, organisational design, training, career and succession planning (Becker, Huselid, Pickus & Spratt, 1997). This implies a strategic role for HR as a source of competitive advantage (Tracey & Nathan, 2002).

Becker *et al* (1997) argued that for HR to be a source of competitiveness, a cross-functional, systems philosophy must be adopted by line and HR managers. In the modern business environment, technology that enables such cross-functional integration is Enterprise Resource Planning or ERP (Davenport, 1998). ERP systems are configurable, off-the-shelf software packages that integrate organizational data resources into a unified system (Markus and Tanis, 2000; Davenport, 2000).

2.5.1 Integrated HRIS

ERP architecture makes it possible to implement the concept of an integrated HRIS (Kovac *et al*, 2002). Through an ERP system, employees have access to input data directly into the system such as, but not limited to travel claims, leave and update personal details. Managers also have access to the records belonging to their staff members (Tansley *et al*, 2001). Despite these apparent benefits, understanding ERP systems poses challenges.

ERP systems are characterised by complexity due to tight integration. They therefore require an integrative framework in order to study their behaviour in organisations (Klaus, Rosemann & Gable, 2000). A framework for ERP implementation was proposed by Al-Mudimigh, Zairi & Al-Mashari (2001). This was based on a review of factors that contribute to successful ERP implementations (Shehab, Sharp, Supramaniam & Spedding, 2004). Muscatello & Parente

(2006) explored post-implementation behaviour of ERP in organizations, concluding that training is critical in sustaining ERP benefits.

Davenport (1998) provided a conceptual model of an ERP-based HRIS, shown in figure 2.1. In this model, the HRIS shares the same database with other functional system components. An ERP-based HRIS has the potential to integrate business processes and facilitate sharing of personnel information for decision making purposes (Mayfield *et al*, 2003). However, Stratman (2007) cautions that ERP implementation alone does not guarantee benefits. Benefits have, therefore been uneven for ERP adopters. This could be attributed to challenges that ERP systems encounter during and after implementation (Xu *et al*, 2002).

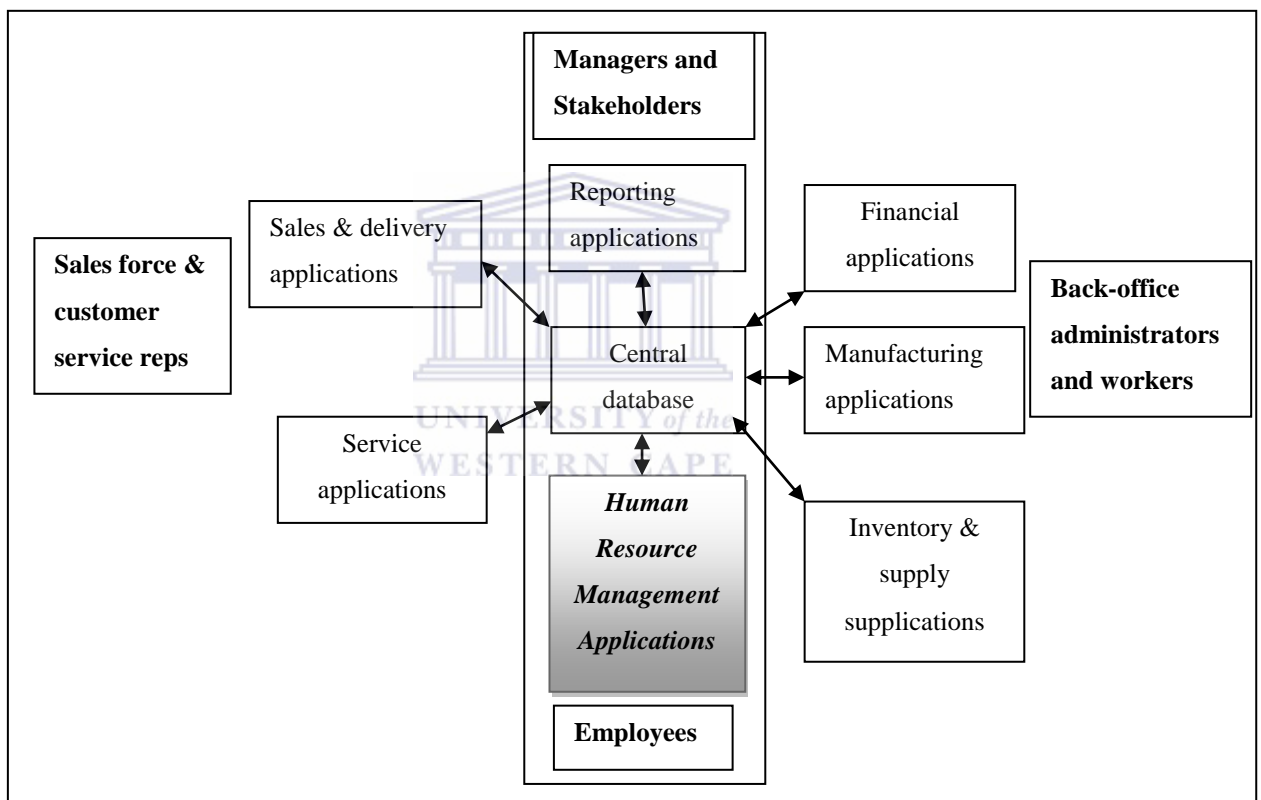


Figure 2-1: Anatomy of an ERP system (Davenport, 1998)

ERP challenges are well documented in literature. They range from lengthy implementations, complexity, technical support, business process redesign, user resistance, budget overruns, data migration, data quality and inflexibility, to name a few (Kim, Lee & Gosain, 2005; Xu *et al*, 2002).

Data quality problems often stem from implementation phase of the project due to factors such but not limited to poor data cleansing and migration (Swartz, 2007). These problems have been found to persist after implementation (Vosburg & Kumar, 2001). It could therefore be expected that an integrated HRIS would inherit data quality problems common in ERP systems in general (Hoover, 2002).

2.5.2 Integrated systems and organisational performance

Despite published ERP problems, a study by Velcu *et al* (2007) revealed a positive relationship between the presence of an ERP system and organisational performance. Faster response to business change, economies of scale, lower headcount costs and lower general administrative costs was reported. Other studies also argue that ERP has the potential to improve organisational performance (Stratman, 2007; Ifinedo, 2007; Wu & Wang, 2006; Somers & Nelson, 2003).

Most studies often investigate ERP as a unit, without focusing on specific functionality such as but not limited to HR. There is however, a reasonable number of studies dressing financial and logistics functionality of ERP (Scapens, 1998; Davenport & Brook, 2004). Advanced searches on published HRIS studies yield a limited number of publications. A study focusing on integrated HRIS is therefore necessary, to understand its impact on HR and organisational performance.

A study of ERP systems and organisational performance is too broad, as noted by Velcu *et al* (2007). The current study therefore opted to focus on factors that could improve benefit realisation from an ERP-based HRIS. In this context, the study was restricted to data quality as a possible determinant of HRIS utilisation and usefulness (Haines & Petit, 1997). The relationship between data quality, system utilisation and usefulness is therefore explored (Seddon, 1997). The aim is to influence SHRM effectiveness and organisational performance (Lawler, 2005)

2.6 Data issues in integrated systems

Quality data is critical to business success (Redman, 2005). Poor quality could result in rework, financial penalties, damaged reputation and lost revenues. Consequently, data quality has been found to drive efficiencies in disciplines such as Healthcare, Supply Chain Management (SCM), Finance and E-business, to name a few (Wang, 1998). Quality data

could be defined as data that meets the requirements of its intended use in a particular situation (Olson, 2003).

2.6.1 Data quality dimensions

Data quality could be better understood in terms of dimensions. Quality dimensions fall into four categories of *intrinsic*, *accessibility*, *contextual* and *representational* (Strong, Lee & Wang, 1997). Data quality categories and related dimensions are shown in table 2-1.

Data quality category	Data quality dimension
Intrinsic	Accuracy, objectivity, believability, reputation
Accessibility	Accessibility, access security
Contextual	Relevancy, value-added, timeliness, completeness, amount of data
Representational	Interpretability, ease of understanding, concise representation, consistent representation.

Table 2-1: Data quality categories and dimensions (Strong, Lee & Wang, 1997).

In table 2.1, *intrinsic* data quality category is concerned with aspects such as correctness and believability. *Accessibility* refers to the ease of access as well as data security. *Contextual* dimensions refer to the relevance of data to the intended user (Lillrank, 2003). *Representational* dimensions refer to the ease of transforming data into useful information. Data stored in ERP should meet these quality requirements in order to add value to the organisation. Poor data quality could have a negative impact on user attitudes towards the information systems and anticipated benefits (Swartz, 2007; Xu *et al*, 2002).

2.6.2 Integrated approach to data quality

The strength of ERP systems lies in the common database which integrates data from diverse units of the organisation (Stratman, 2007). Integrated nature of the system could also be the source of data quality problems (Targowski & Deshpande, 2001). For example, data captured incorrectly in HR could be used by the Sales department, thus presenting incorrect sales agent details and distorting sales reports (Vosburg & Kumar, 2001). Moreover, incorrectly captured employee gender could distort Employment Equity reports for the organisation.

In spite of potential problems, ERP integration could help drive efficient business decisions and strategies (Kovac *et al*, 2002). HRIS presents opportunities for organisation to reduce administrative costs and leverage strategic advantages by gathering, processing and sharing information. Information systems are designed to provide decision support capability to the organisation (Kovach & Cathcart, 1999). ERP systems achieve this objective by unifying data resources of the organisation on a single database (Davenport, 1998). Since data is a strategic asset, it is therefore important to consistently address data quality issues in order realise system benefits (Travica, 2008; Redman; 2005).

Addressing data quality issues in enterprise systems is difficult (Kennerly & Neely, 2001). An integrative approach is therefore required in order to achieve this purpose (Muscatello & Parente, 2006). Table 2-1 provides a structured approach for studying HRIS data quality issues in enterprise systems (Davenport, 2000). It enables development of research instruments in order to gather data on perceptions of HRIS data quality, utilisation and usefulness (Vicente & Reis, 2007). The framework also helps identify quality dimensions that require attention from management (Otto, Wende, Schmidt & Osl, 2007).

2.7 Function and drivers of HRIS

In studying the impact of data quality on system utilisation and usefulness, it is important to understand drivers of HRIS adoption. HRIS provides information about the organisation's Human Resources, a necessary input into strategic decisions (Ngai & Wat, 2004; Mayfield *et al*, 2003; Kovac *et al*, 2002). HRIS reduces administrative burden by automating routine tasks such as, but not limited to updating of employee records, capturing leave requests, viewing and printing payslips via e-HRM, thus saving time and money (Panayotopoulou *et al*, 2007; Ruel *et al*, 2007; Hoover, 2002). The system also leverages the organisation's skilled HR resources to focus on strategic tasks, due to reduced administrative burden (Tyson, 2007; Kovac *et al*, 2002).

It appears that primary drivers for HRIS adoption are information sharing, decision-making and process efficiency among others. An information system that delivers these benefits could be considered successful by its intended users (Seddon, 1997). However, system benefits do not accrue automatically (Stratman, 2007). In the case of an HRIS, a study of determinants of success, which builds on the work of Haines and Petit (1997), is necessary to ensure sustained return on investment. The study could bridge the gap in previous studies where data quality

has not been sufficiently addressed. A study of this nature could, in part, seek to validate realisation of HRIS benefits cited in academic literature (Tyson, 2007; Mayfield *et al*, 2003).

2.8 Information Systems (IS) success

Information systems are considered successful if they add value to the organisation in terms tangible and intangible benefits (DeLone and McLean, 2003). For example, an IS that efficiently consolidates an organisation's reports to enable decision making would be considered successful. IS success has been a subject of much research and controversy over the years (Sabherwal *et al*, 2006). Whyte & Bytheway (1996) cited such controversy as a sign of an immature discipline which was probably not understood.

Various researchers have developed numerous models to understand IS success (Rai, Lang & Welker, 2002). These efforts were attempts to mature the IT discipline in this area (Wu & Wang, 2006). Classical models focused on IS adoption in the context of user behaviour. Examples of these are Technology Acceptance Model (TAM), 3-D model, Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA) and Unified Theory of Acceptance and Use of Technology (UTAUT) amongst others (Sabherwal, Jeyaraj & Chowa, 2006, Davis, 1993). The common denominator in these models is the concept of User Satisfaction (Briggs, Reinig & de Vreede, 2008).

User Satisfaction is difficult to define (Griffiths, Johnson & Hartley, 2007). In the IS context, User satisfaction is defined as the ultimate worth of the system to the user. The definition is associated with information retrieved from the system. Information User satisfaction has been found to be influenced by factors such as but not limited to content, accuracy, format, ease of use, system maturity and timeliness (Khalil & Elkordy, 2005). These are consistent with data/information quality dimensions and categories (Strong, Lee & Wang, 1997).

Pioneers of modern thinking in IS success suggested that IS success should be explained from a behavioural perspective, meaning that experienced ease of use combined with experienced system usability determines attitudes towards the system (Davis, 1989 as cited in Rai *et al*, 2002). Davis termed his model Technology Acceptance Model (TAM) as it explained conditions for users' adoption of technology. Modern theories appear to have built from this model to understand further dimensions of IS success (DeLone and McLean, 2003; 1992; Gable, Sedera & Chan, 2003; Seddon, 1997).

2.8.1 The DeLone and McLean model (1992)

The DeLone and McLean (2003) represents one of the widely used IS success models. It proposes six dimensions of *System Quality*, *Information Quality*, *Use*, *User Satisfaction*, *Individual Impact* and *Organisational Impact*. The original model is illustrated in figure 2-2. Shaded boxes represent dimensions that are considered to be within the scope of this study.

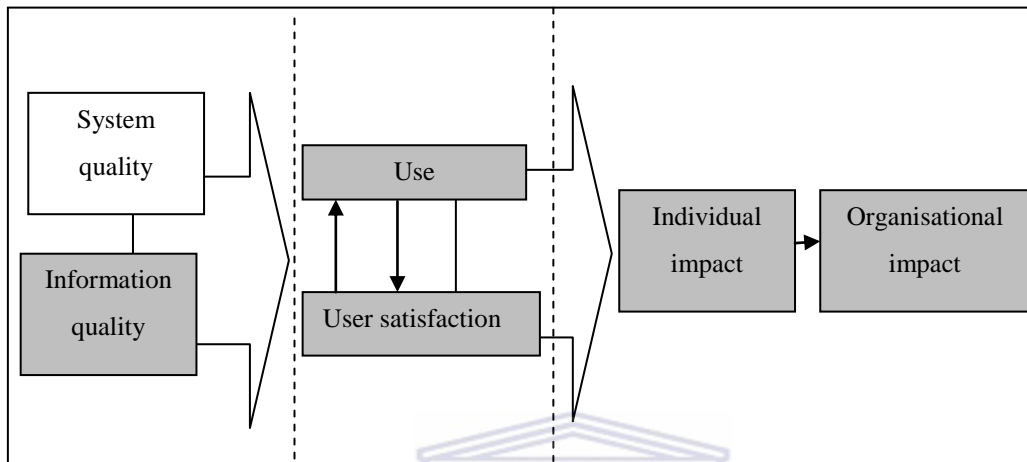


Figure 2-2: IS success model (DeLone & McLean, 1992).

Figure 2-2 shows that system quality and Information quality influences system usage and satisfaction. For example, if users are satisfied with system functionality and quality of information, they are likely to use it, thus improving their individual and team effectiveness. Continued system usage could translate to organisational effectiveness. The system is therefore considered successful when it positively impacts organisational performance (Velcu *et al*, 2007). The same could be applied to an integrated HRIS (Kovac & Cathcart, 1999).

Seddon (1997) criticised DeLone and McLean (1992) model, arguing that IS usage does not necessarily determine individual/organisational impact and that system usefulness was a more appropriate measure than Usage. Seddon (1997) defined perceived usefulness as *the degree to which the stakeholder believes that using a particular system has enhanced their job or organisations performance*. Khalifa and Lui (2003) warned that initial satisfaction with the system does not guarantee future satisfaction or continued usage. It is therefore important to sustain factors that positively influence initial success (Khalil & Elkordy, 2005).

Studies using preliminary DeLone and McLean model (figure 2.2) and Seddon (1997) revealed a close correlation between Usage and Perceived usefulness (Almutairi & Subramanian, 2005; Rai *et al*, 2002). Sabherwal *et al* (2006) found that system quality and perceived usefulness affect system use, whereas user satisfaction does not (Haines and Petit, 1997).

Almutairi and Subramanian (2005) argued for information quality as the strongest determinant of IS success. These diverse findings indicate the complexity of the phenomenon of IS success. However, these studies do imply that information quality could be related to IS usage and overall usefulness. This study could therefore explore the impact that data quality has on usage and perceived usefulness of integrated HRIS (Lee *et al*, 2006).

2.8.2 The DeLone and McLean model (2003)

DeLone and McLean (2003) updated the preliminary model, to take into account the evolution of IT organisations into service providers and user's intention to use the system (Hong *et al*, 2008). They incorporated outsourcing agreements as a dimension of IS service quality. The revised model includes a broader perspective of system impact, summarised as Net Benefits in Seddon (1997).

Figure 2-3 shows the revised model by DeLone and McLean (2003). The model is considered useful for this study as it addresses dimensions of *Systems Quality*, *Information Quality*, *Service Quality*, *User Satisfaction*, *Intention to use*, *System Use* and *Net Benefit*. Information quality, system quality and service quality influence user behaviours (intention to use) towards the system (Rai *et al*, 2008). Positive experiences of using the system are likely to result in user satisfaction (Griffiths *et al*, 2007). The combinations of intention to use, usage and user satisfaction could lead to net benefits.

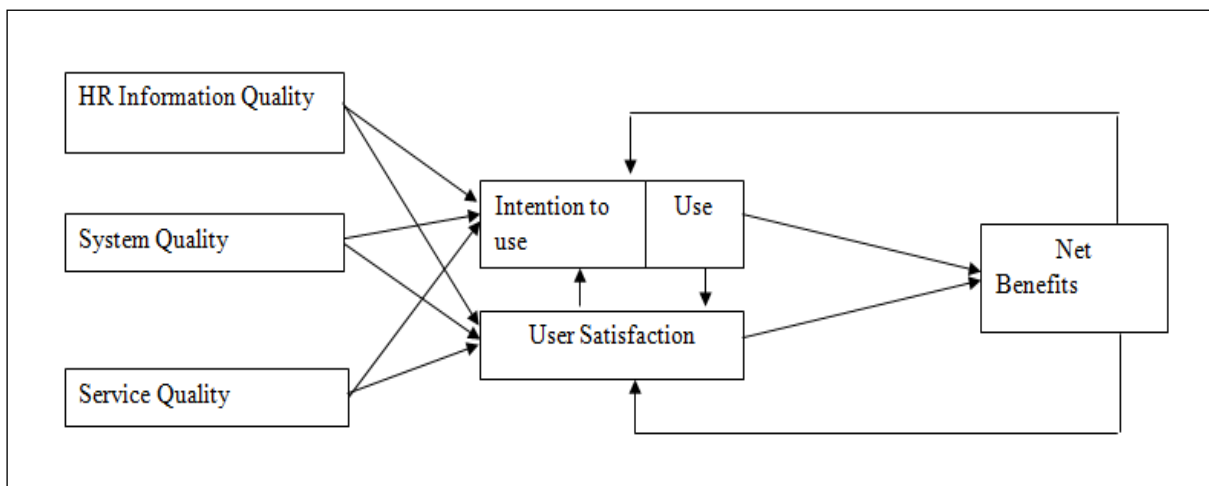


Figure 2-3: DeLone and McLean IS success model (2003).

2.8.3 ERP success model (Gable et al, 2003).

The focus of this study was on ERP-based HRIS. Therefore, a model for studying ERP systems success was deemed necessary. A model for this nature is proposed by Gable, Sedera and Chan (2003). Building from DeLone and McLean, Gable *et al* argued that ERP systems are unique hence they require tailored success models. They developed the ERP success model shown in figure 2-4.

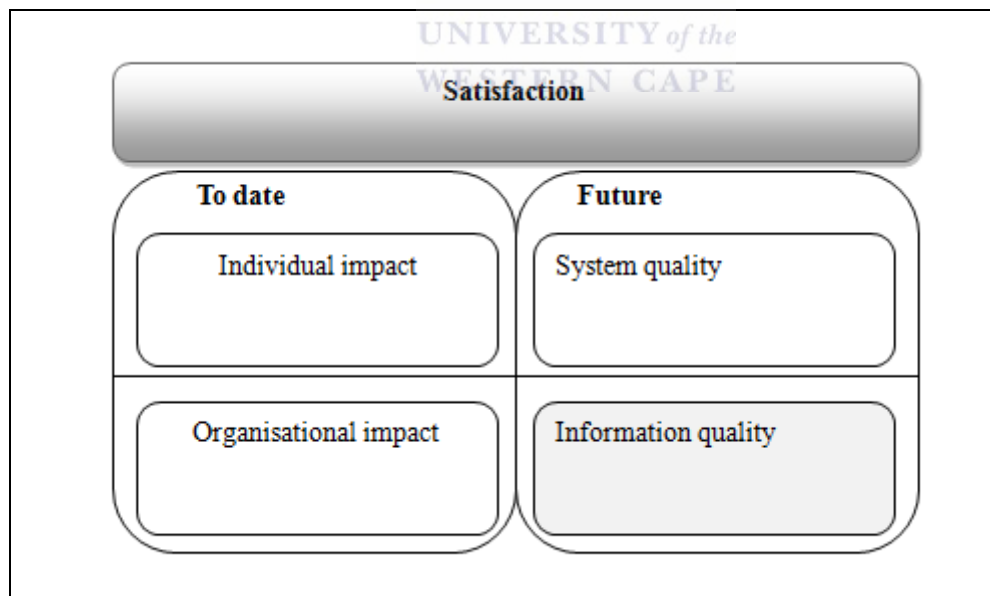


Figure 2-4: ERP success model (Gable et al, 2003).

Figure 2-4 shows that impact dimensions are an assessment of benefits that have (or not) followed from ERP. Quality dimensions reflect future potential of the system. In contrast to this view, Wu and Wang (2007) found that user satisfaction with ERP was closely related to

perceived system usefulness, regardless of the time period. It could therefore be possible to study ERP quality and impact dimension at any given point in time. Information quality is specifically distinguished in figure 2-4 so as to emphasize the focus on this study.

2.8.4 Expanded ERP success model (Ifinedo, 2006)

Ifinedo (2006) expanded the model by Gable, Sedera and Cha (2003) to include vendor or consultant quality as one of the dimensions in ERP success measures (figure 2-5). The figure shows that system quality and vendor/consultant quality are determinants of ERP success. These dimensions are grouped as service quality. Ifinedo (2006) further argued that the quality of an ERP vendor/consultant could impact user satisfaction and perceived system success.

ERP systems are also supported by internal IT organizations (Ifinedo, 2007). In the context of integrated HRIS, the expanded Gable model is consistent with Haines and Petit (1997) who found a strong correlation between user satisfaction and the presence of an effective IT support unit. Service quality is therefore an important determinant of IT usage and overall success.

Figure 2-5, illustrates that ERP success could be measure by vendor/consultant/IT service quality, system quality, information quality, individual impact, workgroup impact and organisational impact. Vendor/Consultant/IT service and system quality could be associated with the IT service being provided to end-users. Therefore, this study considered the above quality and impact dimensions in evaluating data quality issues in ERP-based HRIS.

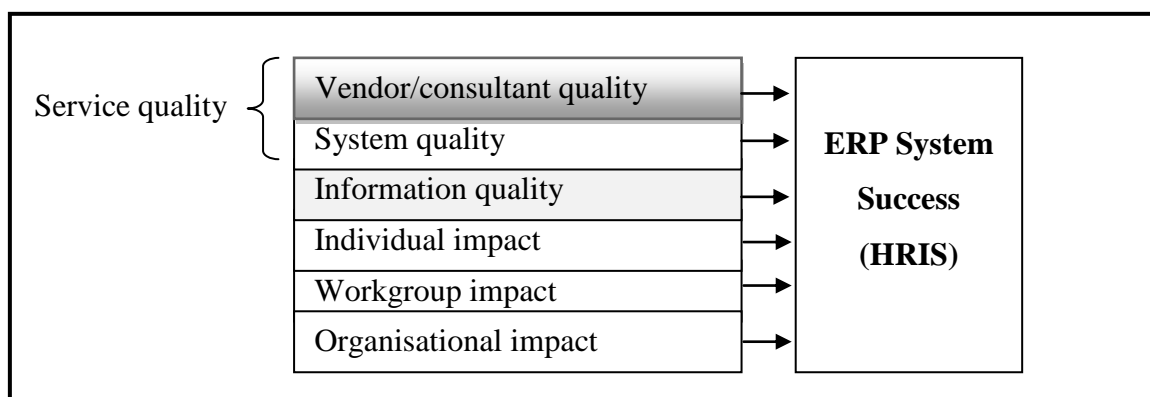


Figure 2-5: Expanded ERP success model (Ifinedo, 2006)

Comprehensive models such as DeLone and McLean (2003) and Ifinedo (2006) informed the design and survey instrument development for studying HRIS. They further enabled gathering of relevant data in order to achieve study objectives. The objective of the study was to evaluate the impact of perceived data quality, utilisation and usefulness of HRIS. In this regard, primary dimensions were data quality, system utilisation and usefulness. Secondary dimensions were service quality and user satisfaction.

Therefore, the success of an ERP-based HRIS could be interpreted in terms of user information satisfaction which takes into account; perceived data quality, utilisation, perceived usefulness of the system, among other factors (Wu & Wang, 2007; Bokhari, 2005). Additionally, such a model should consider, the service perspective of the HRIS to ensure continued user satisfaction and utilisation for sustained benefit realisation (DeLone & McLean, 2003; Ifinedo, 2006; Wu & Wang, 2006)

2.9 Utilisation of HRIS in organisations

The fundamental HRIS objective is to support planning and execution of strategic and tactical organizational goals (Mayfield *et al*, 2003). It could be impossible to achieve this objective unless the system is optimally utilised (Khalil & Elkordy, 2005).

In IS literature, system usage and usefulness are regarded as important determinants of success (Wu & Wang, 2007; Sabherwal *et al*, 2006; Rai *et al*, 2002; DeLone and McLean, 2003). This has implications for the HRIS according to DeLone and McLean's model (2003). The HRIS has to be perceived as useful by its users (Seddon, 1997) from a system and information quality perspectives. Users should therefore utilise the HRIS so as to improve individual and organisational performance (Davis, 1993).

Kinnie and Arthurs (1996) noted that IT usage in by HR was limited to transactional processing, reporting and few decision support systems. HRIS was mostly used by IT professionals as opposed to management. The value of an HRIS lies in the usefulness of information it provides hence HR is demanding reporting capabilities from HRIS suppliers (Kovac & Cathcart, 1999). Most modern systems incorporate decision support functionality, as evident in HRIS that have some reporting capabilities (CedarCrestone, 2008; Kovac *et al*, 2002).

Ball (2001) found that organisational size was a determinant for HRIS existence, regardless of the functionality being utilised. Small organisations, who employ less than 250 employees, were less inclined to implement an HRIS than their larger counterparts. This could be attributed to lack of funding required to an integrated system (Ngai & Wat, 2004; Ball, 2001; Kovac & Cathcart, 1999). Smaller organisations implemented in-house databases and if they had a commercial HRIS, they only used it for administrative purposes.

2.9.1 Determinants of system usage

Haines and Petit (1997) found that higher levels of user satisfaction did not lead to more system usage. This could be ascribed to the fact that IT had not fully evolved to be a strategic business tool at the time of the study (Kemarati, 2007). Ball (2001) found that HRIS usage was influenced by HRIS age, among other factors. The older the HRIS the more it was utilised. The observation could indicate that the organisation has overcome initial adoption problems (Gable, Sedera & Cha, 2003).

Literature appears to be devoid of focus on HRIS usage as it pertains to individual and organisational effectiveness. Antecedents of HRIS usage in organisations do not seem to be adequately researched (Tansley & Newell, 2007; Ngai & Wat, 2004). These studies also did not apply *user information satisfaction* (UIS) theory to understand antecedents of HRIS usage and related implications for organisational performance (Bokhara, 2005).

UIS interrogates whether a particular system satisfies the information needs of its users (Griffiths, Johnson & Hartley, 2007). A UIS approach could therefore reveal the critical information requirements of the users such as data quality (Eppler, 2006).

Despite identified gaps in literature, published studies provided valuable parameters for this research such as, but not limited to organisation size, organisational role of end-users, HRIS impact on individual and organisational performance. It is therefore appropriate to study HRIS phenomenon in the context of large organisations, which have been found to utilise integrated applications. Perceived HRIS impact on individual tasks and overall organisation can also be studied.

2.10 Data Quality Management practices in enterprises

In the context of data quality, data is defined as raw facts (Otto, Wende, Schmidt & Osl, 2007). Data is also a collection of facts, usually collected as the result of experience, observation or experiment, or processes within a computer system, or a set of premises (Beynon-Davis, 2002). Data can also be viewed as information recorded in a form that can be processed by equipment operating automatically in response to instructions given for that purpose (Marchand, 2000).

Data should be viewed and managed as a strategic corporate resource (Redman, 2005). However, some organisations do not seem to understand the relationship between data and business performance (Krcmar, 2005; Redman, 1995). For example, an organisation that does not effectively manage its financial, sales, personnel, marketing and product data could be outperformed by competitors. The loss of competitive advantage could threaten continued existence of the organisation.

Enterprises often do not pay attention to data quality problems since such problems may not manifest as data problems. These could manifest as identity theft, disputed elections, misstated financial results, incorrect statutory reports and medical errors (Redman, 2000). It is also difficult to quantify the cost of poor data quality. Combinations of organisational, political and social factors, to name a few, do appear to impede implementation of data quality management initiatives (Redman, 2005).

Data represents the foundation for generating business-related information for efficient business processes, reporting and analytics (Otto *et al*, 2007). In this context, data could be seen as raw material for information production (Checkland & Hollowell, 1998). Data could also yield significant benefits such as, but not limited to cost savings, improved compliance and efficient decision-making. Data becomes information when it is given context and meaning for its intended use (Lillrank, 2003). Therefore, data requires proper management in order to realise business benefits (Redman, 1995).

2.10.1 Data Quality Management

Data Quality Management entails establishment and deployment of roles, responsibilities, policies, procedures and systems for acquisition, maintenance, dissemination, and disposition of data (Krcmar, 2005). DQM is therefore neither technology nor business processes but a combination thereof.

Data Quality Management (DQM) is difficult to implement (Wang, 1998). Helfert, Zellner and Sousa (2002) discovered that most enterprise do not have clearly defined roles for data quality management. Moreover, an organisational-wide initiative requires an understanding of what DQM entails, such as applicable methods and techniques (Vosburg & Kumar, 2001).

DQM requires a specific framework that aids in the comprehension and design of effective necessary activities in order to be effective (Otto *et al*, 2007; Olson, 2003). Wang (1998) developed Total Data Quality Management (TDQM) framework as a product-oriented approach to DQM. The framework was aimed at improving business performance.

By viewing information as a product, Wang associated data with raw materials in a manufacturing process. The assembly line was associated with the information system while product (output) was likened to information. Viewing Information as a product also allows definition of its quality attributes (Strong *et al*, 1997). The contrast between Product and Information manufacturing processes is provided in table 2-2.

	Product manufacturing	Information manufacturing
Input	Raw materials	Raw data
Process	Assembly line	Information system
Output	Physical products	Information products

Table 2-2: Product vs. information manufacturing (Wang, 1998)

Table 2-2 shows that information manufacturing, raw data is processed by an information system to produce information products. It could therefore be expected that the classic saying of garbage in, garbage out should apply. This means that raw poor data (input) will result in poor information product (output). It is critical to ensure data quality in order to obtain quality information products (Lillrank, 2003). Quality information products are those that meet requirements of intended users (English, 2001).

Information products are manufactured, distributed and consumed by intended users (Davenport & Brooks, 2004). Kovac, Lee and Pipino (1997) identified roles in the data/information delivery process. They categorised the roles as data generators, distributors and consumers. Figure 2-6 shows that data is manufactured by originators and distributed through various media to consumers. This process refers to the generation and organisation of data into meaning information for consumption by intended consumers. Data quality requirements, as defined by consumers, should therefore be met by originators and distributors (Wang & Strong, 1996).

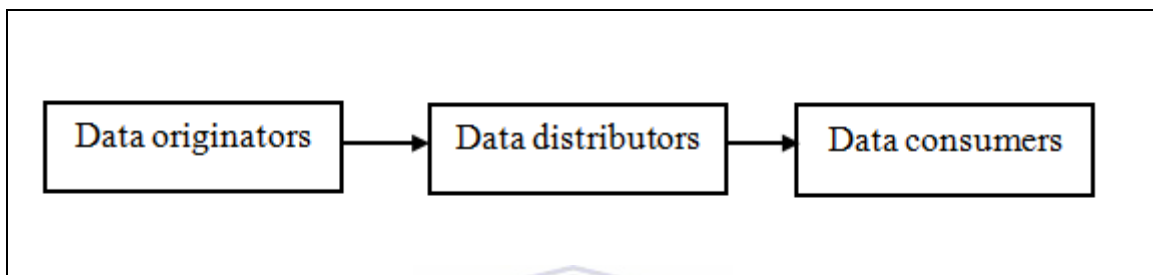


Figure 2-6: Roles in information delivery (Kovac *et al.*, 1997)

2.10.2 End-user roles in HRIS information delivery

In the context of HRIS, HR administrators and general employees could be categorised as data originators (Kovac *et al.*, 1997). HR Business Analysts and Consultants could be viewed as information manufacturers while Executive, HR practitioners, senior and middle management are considered information consumers (Wang, 1998). A clear distinction of these roles in the business is critical to the success of data quality initiatives (Krcmar, 2005).

Despite definition of these roles in HR, overall data quality management responsibilities are still debated by IT and business (Redman, 2005). Friedman (2006) noted that the responsibility of managing and improving corporate data has been incorrectly assigned to IT. Otto, Wende, Schmidt and Osl (2007) argued that a partnership between the business and IT is essential for any data quality management effort to succeed.

2.10.3 Total data quality management (TDQM)

In TDQM, business stakeholders are responsible for establishing rules that govern data and are ultimately responsible for verifying data quality. IT is responsible for establishing and managing the overall environment, that is architecture, technical facilities, systems, and databases – that acquire, maintain, disseminate, and dispose of the electronic data assets of the organization (Otto *et al*, 2007). This role definition provided key parameters for this study as it sought to understand data quality from IT and business perspectives (Redman, 2005).

In ERP, data quality issues often received attention during implementation. For example, data quality is only considered during cleansing and migration of legacy system data (Xu, 2002). There is limited evidence of post implementation data quality initiatives, more so in HRIS. Therefore, TDQM provides an approach to studying data quality, roles, utilisation and usefulness. System impact on organisational performance could also be studied (Wang, 1998).

HRIS captures raw data (input) and manipulates (process) into useful information products (IP) that are consumed within the Human Resources function. Information Products should meet consumers' quality requirements in order to be perceived useful and therefore utilised for decision-making (Strong *et al*, 1997).

TDQM is generic, thus allowing this study to apply general concepts such as DQM in understanding HR data quality in organisations (Lee, Pipino, Funk & Wang, 2006). Perceptions of data quality management responsibilities between business and IT could also be studied (Otto *et al*, 2007). Moreover, the roles in information manufacturing and distribution process provide key parameters. These allowed the researcher to study perceptions on data quality, system utilisation and usefulness across all three roles (Friedman, 2006).

2.11 Impact of poor data and information quality

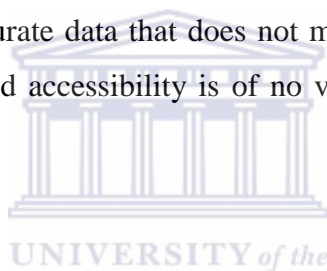
In order to build effective institutions and achieve quality, management teams require timely human resources information (Hosie, 1995). This could be made possible by HR technologies that provide quality information (Lee & Strong, 2003).

Primary consumers of information are often referred to as information/knowledge workers. English (2001) defines knowledge workers as those who use the information to perform their

work. Lack of quality information could negatively impact knowledge workers thus could threatening organisation's existence (Redman, 2005).

Information/knowledge workers are dependent on data generators in order for them to be effective (Eckerson, 2002; English, 2001). Research indicates that data serves as raw inputs in information manufacturing process (English, 2001). Information products are distributed through various media and formats (Wang, 1998). It is important to ensure that data meets intrinsic, accessibility, contextual and representational quality requirement throughout process (Lee & Strong, 2003; Kovac & Cathcart, 1999). Lack of quality across this production process could have negative implications for the organisation (Helfert *et al*, 2002).

Data quality problems often remain unknown or are ignored hence they are seldom publicised (Redman, 2005, Khalil & Harcar, 1999). Redman (2005) notes that companies that measure data quality often focus on the accuracy (intrinsic) dimension, at the expense of other dimensions. For example, accurate data that does not meet other quality dimensions such as contextual, representational and accessibility is of no value to consumers (Wang & Strong, 1996).



2.11.1 Strategic impact

From a strategic and tactical perspective, poor data quality compromises decision-making (Boateng, 2007; Eckerson, 2002). For example, an organisation in the financial services sector might want to know if it has adequate actuaries to expand its business. Quality talent management reports and market information could therefore help the organisation make informed decisions.

Redman (2005) notes that cost of poor data quality include, among others customer dissatisfaction, increases difficulty and risk in implementing new technologies, poor planning. Poor data quality has the potential of putting companies at a competitive disadvantage by making it more difficult to execute emergent strategies in areas such as data warehousing , healthcare, customer relationship management (CRM) and e-business (Eppler, 2006). Poor data quality could also result in loss of credibility in the information system producing management reports (Eckerson, 2002).

Operationally, data quality problems increase operating costs through rework, overtime and distribution among others. Time delays between operating units also increases loss of productive hours (Friedman, 2006). The overall impact of poor data quality is poor organisational performance (Ryu, Park & Park, 2006). According the hierarchical definition of information, operational and strategic HR decisions cannot be executed without quality data (Knox, 2007; Lee *et al*, 2006). Therefore, the value of the information system is in the quality of information it provides for decision making (Kovac *et al*, 2002).

Researchers have reported on the impact of poor data quality in organisations (Lee *et al*, 2006; Kovac *et al*, 2002). However, they did not address the impact of perceived data quality on HRIS utilisation and usefulness. Scholars seem to have paid limited attention to perceived impact of the HRIS on overall organisational performance. In addition to this, there is limited reference to either HRIS or ERP specific data quality issues in literature studies. Lee *et al* (2006) and Kovac *et al* (2002) highlight the importance of data quality on the organisation's survival thus contributing to the theoretical framework of this study.

The impact of poor data quality in enterprises motivated the objectives of this study. The study aimed to understand perceived HR data quality in the context of HRIS and its influence on system usage and overall system usefulness (Khalil & Elkordy, 2005). It is therefore necessary to establish a case for HRIS data quality due to the impact it has on organisational performance (Wang & Shyu, 2007; Teo & Crawford, 2005).

2.12 The proposed HRIS data quality framework

The disciplines and models presented in the preceding sections outlined theories underpinning the framework used to approach the study. The researcher acknowledges that these were developed in different periods, contexts, using diverse processes. However, relevant key components of these theories were selected for this study. This is in line with pragmatism approach outlined in chapter 3 (Amaratunga, Baldry, Sarsha & Newton, 2002).

The framework proposed in this study combined the models of DeLone and McLean (2003) and Ifinedo (2006). DeLone and McLean (2003) provides a generic IS success model. Ifinedo (2004) provides a framework to study ERP applications. The objective of the framework was to study the influence of perceived data quality on utilisation and usefulness of HRIS at large South African organisations (Ball, 2001). The impact of HRIS on individual and organisation

performance was also evaluated. General satisfaction with the HRIS was studied (Medina & Chaparro, 2008). The HRIS data quality framework is depicted in figure 2-7.

Modern HR functions are supported by integrated HRIS, embedded in ERP systems. ERP systems support organisational business processes. The key ERP benefit is that company-wide data is captured, updated, aggregated and stored in a form that could be used to generate management reports (Markus & Tanis, 2000). Decisions can therefore be made on the basis of comprehensive information (Davenport, 2000).

A successful HRIS is continuously utilised and provides useful information to its users (Kennerly & Neely, 2001). System utilisation (a determinant of IS success) is influenced by data quality and perceived usefulness (Khalil & Elkordy, 2005). Satisfied users would continue to use the system thus improving individual and organisational effectiveness (DeLone & McLean, 2003).

ERP systems were considered a useful variable to study as they are prevalent in large organisations (Ngai & Wat, 2004). The single database in ERP architecture provides an environment for data quality challenges (Xu *et al.*, 2002; Ball, 2001; Davenport, 1998). TDQM is essential in understanding interdependencies between data and information (English, 2001). DQM provides a classification of categories and dimension, to isolate data quality problems (Strong *et al.*, 1997).

The HRIS Data Quality framework (Figure 2-7) suggests that when HR data is perceived to be of high quality by relevant stakeholders, resultant information should also be perceived to be of high quality (Eppler, 2006; Strong *et al.*, 1997). Such perceptions are expected to prompt users to utilise the HRIS thus increasing their individual and team effectiveness. As organisational effectiveness improves, users become more satisfied with the system and hence continue to use it.

Satisfied users who perceive the system to be useful would continue to utilise it, leading to sustained organisational performance (Seddon, 1997). Perceived usefulness of the HRIS should prompt more HR users to utilise the system, due to the quality of information it provided (Bokhara, 2005). Continued usage should improve administrative efficiency and leverage HR strategic capabilities (Tracey & Nathan, 2002). Investment in HRIS would therefore be justified (Stratman, 2007; Keramati, 2007).

The operational and strategic effectiveness of individuals in the HR department accelerates accomplishment of organisation goals and competitive advantage (Chang & Huang, 2005). Perceived quality of the *system* and *IT services* were studied, although they were not main variables of this study. These were explored for their possible influence on user satisfaction and perceived HRIS usefulness (Ifinedo, 2006; DeLone & McLean, 2003).

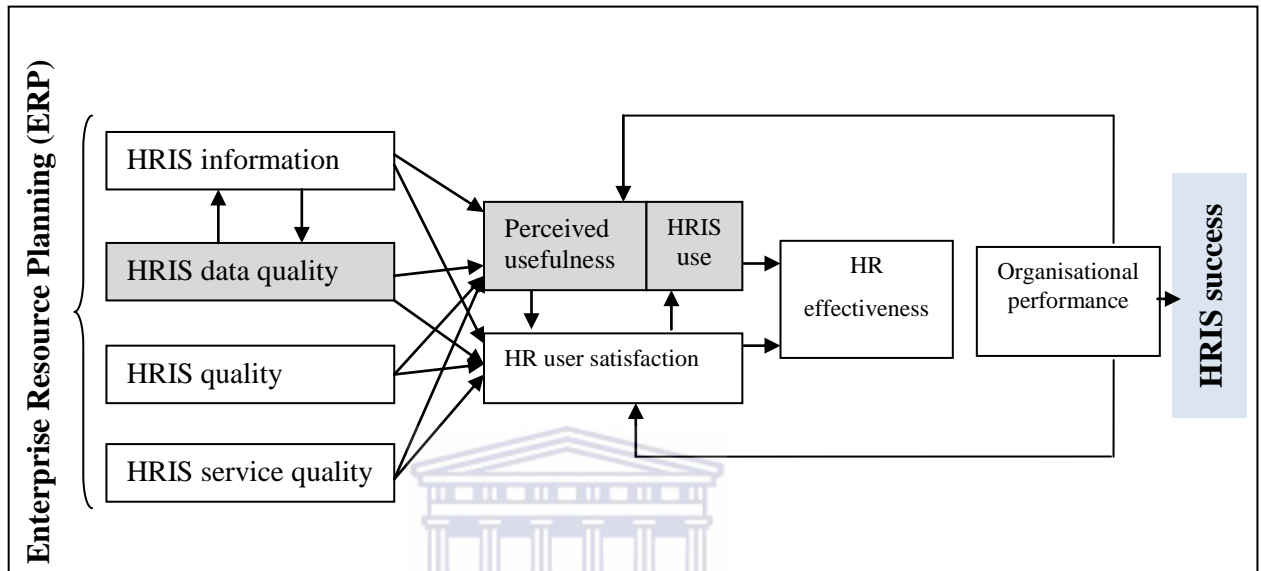


Figure 2-7: HRIS data quality framework, (DeLone & McLean, 2003).

2.13 Chapter summary

In building a theoretical framework for studying impact of perceived data quality on utilisation and usefulness of HRIS, this chapter has explored literature in strategic HRM, ERP, HR information systems, IS success, data quality management and total data quality management. The evolution of the role of the HR function was explored. The literature review further explored the role of IT in supporting SHRM.

SHRM and organisational performance was explored, revealing issues regarding alignment of HR and business strategies. ERP-based HRIS were explored and their relevance to SHRM. Information system success and its measurement in terms of user information satisfaction were studied. Interrelations between data and information were studied, including organisational impact of data quality problems. The chapter culminated in the proposal of a framework to study and interpret HRIS data quality issues.

The next chapter (**Chapter 3** - Research Design and Empirical Results) describes the research method, instrument, population sample and data gathering techniques employed in this study. This should give an appreciation of how this study was conducted from a methodological perspective, providing assurance of the validity and reliability of subsequent findings.



3 Chapter 3: Research design

3.1 Introduction

The objective this study was to investigate the relationship between perceived data quality, utilisation and perceived usefulness of integrated HRIS. The study was limited to large organisations operating in South Africa. For the purposes of the study, a large organisation was defined as one that employs more than 200 employees (Department of Trade and Industry, 2003). These companies are above the threshold of Small and Medium Size Enterprises (Abor & Quartey, 2010). IS success models by DeLone and McLean (2003) and Ifinedo (2006) provided a conceptual framework (figure 2-7) upon which the study was based.

The study sought to answer the following question:

- *What is the relationship between perceived data quality, utilisation and perceived usefulness of an integrated HRIS?*

All research, whether quantitative or qualitative is based on certain underlying assumptions about what constitutes valid research and which research methods are appropriate (Myers, 1997). Understanding these assumptions enables the reader to gain an appreciation of methods applied in reaching study conclusions (Williams, 2007). It is therefore important to understand rationale applied in designing and completing this study.

3.2 Selection of research design

Research is often confused with mere information gathering, documentation of facts and dissemination of information (Leedy & Ormrod, 2005). According to Leedy and Ormrod (2005), *research* could be viewed as a process of defining objectives, managing data, interpreting and communicating findings. This process occurs within established *frameworks* (methods) and guidelines which indicate research scope, how research is conducted and what type of conclusions could be drawn from collected data (Williams, 2007). A research *method* is therefore a framework used to extract meaning from the study data (Leedy & Ormrod, 2005).

A research framework could be *deductive*, *inductive* or both. In deductive research, a theoretical framework is built from existing literature and tested during the investigation (Denzin & Lincoln, 2000). In inductive research, the researcher sets out to build new theories from research data (Creswell, 2005). This study combined both approaches by testing existing models (figure 2-7) and looking for emerging theories from collected data. This was done in order to enhance study rigor and subsequent conclusions (Denzin & Lincoln, 2005).

Creswell (2003) lists three common search methods, which are quantitative, qualitative and mixed method. This study applied qualitative methods as they were found suitable for numerical data gathering and analysis (Johnson & Onwuegbuzie, 2004). Qualitative methods were also applied for their suitability to textual data thus aiding understanding of social phenomenon (Williams, 2007). Each of these methods has inherent shortcomings hence a single method would have sufficed (Tashakkori & Teddlie, 2003).

This study sought to understand user perceptions of HRIS data quality, a social phenomenon (Johnson & Onwuegbuzie, 2004). Qualitative interviews were deemed appropriate in understanding these perceptions (Kvale, 1996). The study was conducted by researcher who is employed on a full-time basis. There was therefore a need to efficiently collect data remotely. A quantitative online survey research method was employed for this purpose (Dillman, 2006). Therefore, the study applied mixed research methods, combining quantitative and qualitative approaches. This was done in order to obtain a holistic understanding of phenomenon being studied (Sale, Lohfeld & Brazil, 2002).

3.3 Mixed research method

Selection of mixed approach was based on the premise that a single method could not comprehensively address phenomenon being studied, that is data quality in HRIS (Williams, 2007). For example, a purely quantitative approach would have overlooked the underlying rationale behind user perceptions data quality and HRIS usefulness. Application of purely qualitative methods would have made it difficult to understand causal relationships between data quality, utilisation and usefulness (Creswell, 2003).

There is however, debate about mixing research methods in a single study as they appear fundamentally different from a paradigm perspective (Buzeley, 2002). A paradigm could be defined as a “worldview” or a basic set of beliefs or assumptions that guide a researcher’s

inquiry (Creswell, 1998). The debate on research methods and their practical implications guided the design and execution of this study (Sale, Lohfeld & Brazil, 2002).

The debate is on whether quantitative and qualitative methods are mutually exclusive or complementary (Rocco, Bliss, Gallagher & Perez-Prado, 2003). Scholars argue that methods could be philosophically different but practically useful in enhancing findings (Onwuegbuzie & Leech, 2004; Tashakkori & Teddlie, 2003). It does however appear that this debate is more philosophical than practical, thus calling for a pragmatic approach (Krauss, 2005). Pragmatism calls for using whatever philosophical and/or methodological approach that works best for the particular phenomenon under study (Onwuegbuzie & Leech, 2006; Tashakkori & Teddlie, 2003).

In selecting a research method for this study, the researcher considered criticism often levelled against mixed methods. Mixed methods are criticized for increasing the amount of time, cost and resources required to conduct research (Creswell, 2003). Readers also could be biased towards their favoured approach when interpreting a study based on mixed approach (Bazeley, 2002). Moreover, quantitative data is not always objective and qualitative data hardly reflect realism (Tashakkori & Teddlie, 2003).

Despite the criticism, mixed research method was chosen for its strengths in meeting objectives of this study (Creswell, 2003). Mixed research method allowed the researcher to design a single study that provided both quantitative and qualitative data. This approach enabled the researcher to answer questions about a complex phenomenon (data quality) and understand causal relationships between study variables (Williams, 2007). For example, apart from statistical correlation, qualitative data aided understanding of how data quality influences system utilisation and perceived usefulness.

Mixed methods could improve validity of data where it is applied to the same set of data (Rocco *et al*, 2003). For example, allowing respondents to complete a survey and follow-up with qualitative interviews to understand their perceptions. Mixed research method also enhances researcher's skills across the extreme paradigms of positivism and constructivism. The researcher therefore becomes competent in both research paradigms (Tashakkori & Teddlie, 2003).

Mixing methods capitalises on strengths of each method to generate a comprehensive data pool for analysis (Creswell, 2003). For example, instead of relying on statistical correlations, qualitative interviews provided rational behind quantitative observations.

3.4 Pragmatic approach to mixed research

The choice of mixed methods was also influenced by Onwuegbuzie and Leech (2006) who suggested that researchers should focus on how both methods enhance research and findings. This implies that less attention should be paid to differences between the methods. The issue therefore is not conformance to a particular approach but whether the researcher has made a sound methodological decision, given the purpose of the study, research questions and available resources. This approach is called *pragmatism* (Amaratunga, Baldry, Sarsha & Newton, 2002).

Pragmatism therefore calls for using whatever philosophical and/or methodological approach that works best for the particular research phenomenon under study (Onwuegbuzie & Leech, 2006; Tashakkori & Teddlie, 2003). Based on the research problem (Chapter 1), conceptual framework (Chapter 2) and advantages of mixed methods, *pragmatism* was selected as the “mixed” approach for this study. The pragmatic approach taken in this study was to use a quantitative electronic questionnaire as well as qualitative semi-structure interviews. These mixed methods were taken to maximise resource usage and improve response rates (Denzin & Lincol, 2005). The strength and suitability of each selected method is discussed in the next sections.

3.4.1 Quantitative research method

Quantitative research methods assume that reality can be objectively constructed by applying statistical models data (Sobh & Perry, 2005). Common *methods* of quantitative research are correlation, development design, observational studies and surveys. These methods can be used with causal comparative approaches (Williams, 2007). These were therefore suitable for understanding causal relationships between data quality, utilisation and usefulness (Onwuegbuzie & Leech, 2004).

Quantitative studies use methods of inquiry such as surveys to collect data on a predetermined instrument for statistical analysis. Quantitative research can be classified as descriptive, experimental and causal comparative. Therefore, quantitative questions applied to the research instruments were therefore descriptive and relationship inclined (Onwuegbuzie & Leech, 2006). For example, HR managers were asked to describe what quality meant to them and justify their answers. This approach provided both quantitative and qualitative data for analysis and interpretation.

Descriptive research involves identification of characteristic of a particular phenomenon or the correlation between two or more phenomenon. Causal comparative research examines how the independent variable(s) are affected by the dependent variable and therefore involves cause and effect relationships (Williams, 2007). This study sought to understand correlation relationships between data quality, system utilisation and perceived usefulness. Causal comparative research was therefore considered a plausible approach to this study. For example, correlation models were created in chapter 4 to understand the relationship between data quality, system utilisation and usefulness.

3.4.2 Strengths and limitations of quantitative research

Quantitative methods are often criticised for failing to provide context in the phenomenon being studied. Data collected is usually limited to predefined questions on the research instrument hence might omit important details relevant to the study (Matveev, 2002). For example, use of purely quantitative approaches to this study could have omitted important details as to why participants responded in a particular manner. Therefore, the study could have been devoid of the context of data quality, system utilisation and perceived usefulness. This shortcoming in quantitative methods was overcome by utilisation of qualitative semi-structured interviews to give context to quantitative data (Creswell, 2003).

Despite publicised limitations, quantitative studies allow the researcher to be independent of the phenomenon under study and therefore free of bias. For example, quantitative data was collected by means of surveys where the researcher was not present to influence a particular response (Abareshi & Martin, 2008). HRIS users and IT resources responded to the online questionnaire at their own computers. It is therefore believed that their responses were free of bias and researcher influence (Sica, 2006). This belief was based on the fact that the research

instruments (questionnaire and interview guide) were tested for reliability, validity and bias (Vermooten, 2006).

Quantitative methods can also yield large amounts of data thus enabling adequate analysis of study phenomena (Abareshi & Martin, 2008). The use of an online survey instrument enabled the researcher to collect sufficient amount of data for analysis and interpretation. The largest amount of data for this study was quantitative (see concurrent research design). These were responses to the online questionnaire on data quality.

3.4.3 Survey Research

There are various methods of collecting data in quantitative research, for example, participant observation, experiments and survey research (Matveev, 2002). Participant observation and experiments were discounted for this study since they are time consuming. They also require the researcher to be present in order to collect data (Creswell, 2003). Survey research was therefore preferred due to its efficiency in data collection and analysis (Abareshi & Martin, 2008).

A survey is a means of collecting information about the characteristics, actions or opinions of a large group of people often referred to as the sample population (Pinsonneault & Kraemer, 1993). Survey research constructs structured data which can describe characteristics and the relationships between data elements in order to advance academic knowledge. Independent and dependent variables can be clearly defined in quantitative studies, thus eliminating ambiguity during data analysis (Matveev, 2002).

Survey research was used because it was relatively inexpensive and faster, especially when administered electronically (Vicente & Reis, 2007). A survey is efficient in collecting specific data since questions are pre-defined. Survey research also has potential to elicit more honest responses as it is completed away from the researcher (Pinsonneault & Kraemer, 1993).

Survey research is often associated with low response rates as respondents could ignore the survey or subsequent reminders (Baruch, 1999). Online surveys could be mistaken for spam e-mail and thus be blocked by corporate firewalls (McElroy, 2003). In order to overcome these shortcomings, the researcher visited most potential participant companies. This was done to meet potential *informers*. The *snowballing* sampling technique helped increase slow

response rates (Onwuegbuzie & Collins, 2007). E-mail invitations were sent as text where firewall configurations could not be confirmed (Vicente & Reis, 2007).

Survey research is also criticised for being inflexible due to predefined questions and answers (Abareshi & Martin, 2008). This limitation in survey research was addressed by use of semi-structured interviews to provide a level of flexibility (Kvale, 1996). Open-ended questions provided required flexibility. Population representation in survey research is often questioned as it is not possible to do random selection. Application of purposive and snow-balling sampling methods ensured population representativeness (Matveev, 2002).

3.4.4 Qualitative research methods

Qualitative research paradigm suggests that reality can be socially constructed and therefore is constantly changing (Myers, 1997). In qualitative studies, research occurs in a natural setting where the researcher is involved with the phenomenon being studied (Creswell, 2003). Qualitative research employs inductive reasoning where the research is able to induce a particular response by tailoring techniques such as interview questions to a specific situation (Leedy & Ormrod, 2005).

Methods commonly applied in qualitative research are case study, ethnography, phenomenology, grounded theory and content analysis. Data collection includes interviews, observations, document analysis among others (Williams, 2007). Interviews were selected as qualitative data collection method for this study. This method was selected due to its flexibility, which is lacking in qualitative approaches. Other qualitative data collection methods such as observations were discarded as they were deemed resource intensive in the context of the researcher (Denzin & Lincoln, 2003).

3.4.5 Qualitative research through phenomenology

Qualitative research is often associated with phenomenology (Creswell, 1998). The focus of phenomenology is to understand participants' perceptions of phenomenon being studied. A phenomenological study therefore seeks to uncover deep-underlying perceptions of phenomenon by interacting with participants. In most cases, the researchers has a certain level of experience in the phenomenon hence could be biased (Johnson & Onwuegbuzie, 2004). This qualitative approach suited the researcher as he is a former HRIS specialist.

In phenomenology, data collection occurs primarily through interviews (Creswell, 2003). Interviews could be unstructured, structured or semi-structured. Structured interviews use closed questions. Semi-structured interviews use open-ended questions and hence are more flexible (Hannabus, 1996). In unstructured interviews, questions develop during the course of the interview. There is therefore danger that the interview could lose focus (Kvale, 1996). Semi-structured interviews were used for this study to provide focus and flexibility in qualitative data collection (Johnson & Onwuegbuzie, 2004).

Qualitative interviews sought to elicit perceptions about how data quality influences utilisation and perceived usefulness of an integrated HRIS. For example, HR executives were asked to provide their perceptions about the overall data quality in their HRIS. They were further asked if their thought their HRIS was optimally utilised. Another question asked if they perceived their system as a useful business tool. Responses to these questions were supported by qualifying statements thus bringing them into context (Krauss, 2005).

3.4.6 Strengths and limitations of qualitative methods

Qualitative research methods are often criticised for departing from the original objectives of research, in response to changing phenomenon (Leedy & Ormrod, 2005). Qualitative methods are also not designed to objectively identify causal relationships. The researcher must also be experienced in data collection (for example, interviewing) so as to obtain quality information for analysis (Tashakkori & Teddlie, 2003). Consistency and reliability of data is also a concern in qualitative methods as respondents could provide conflicting information (Matveev, 2002).

The use of semi-structured interviews and quantitative questionnaire ensure that the study does not depart from main objective. Qualitative content analysis and correlation statistics assisted in understanding relationship between study variables (Johnson & Onwuegbuzie, 2004). The researcher utilised his experience as an HRIS business analyst to conduct effective qualitative interviews. Reliability of the qualitative interview instrument was addressed through a test-retest method, that is pilot study (Mehra, 2002).

Qualitative methods obtain a realistic view of the real world through interacting with participants, which is not possible in quantitative research. There is greater flexibility in qualitative research since researcher is able tailor interview questions to uncover new insights

into the phenomenon (Tashakkori & Teddlie, 2003). Qualitative approach also allowed the research to interact with participants in their own language and terms, thus obtaining a holistic view of HRIS data quality (Matveev, 2002).

3.4.7 Phenomenology and Triangulation

This study sought to understand the influence of perceived data quality on utilisation and perceived usefulness of HRIS. Phenomenology was therefore deemed appropriate for the study as it sought to uncover user perceptions. One of the effective approaches in implementing mixed methods is triangulation (Onwuegbuzie & Leech, 2004). Triangulation combines two or more data sources, investigators, methodological approaches, theoretical perspectives or analytical methods within the same study (Thurmond, 2001).

Denzin and Lincoln (2003) identified *data, investigator, theoretical* and *methodological* triangulation. Triangulation in research serves two purposes; confirmation and completeness. Triangulation confirms validity, reliability and removes bias if applied to the same set of data. Completeness is enhanced by collection of both quantitative and qualitative data, thus providing more insight into the phenomenon (Denzin & Lincoln, 2003). Methodological and data triangulation we applied to this study to ensure validity, reliability and completeness.

Figure 3-1 shows how triangulation was applied in this study. Qualitative and quantitative research methods were employed, giving rise to a mixed method research. Quantitative survey research and phenomenological semi-structured interviews were designed and deployed concurrently to collect and analyse data (Hanson, Creswell, Plano Clark, Petska & Creswell, 2005). Data was concurrently analysed (chapter 4) using statistical methods as well as qualitative content analysis to draw conclusions (Johnson & Onwuegbuzie, 2004).

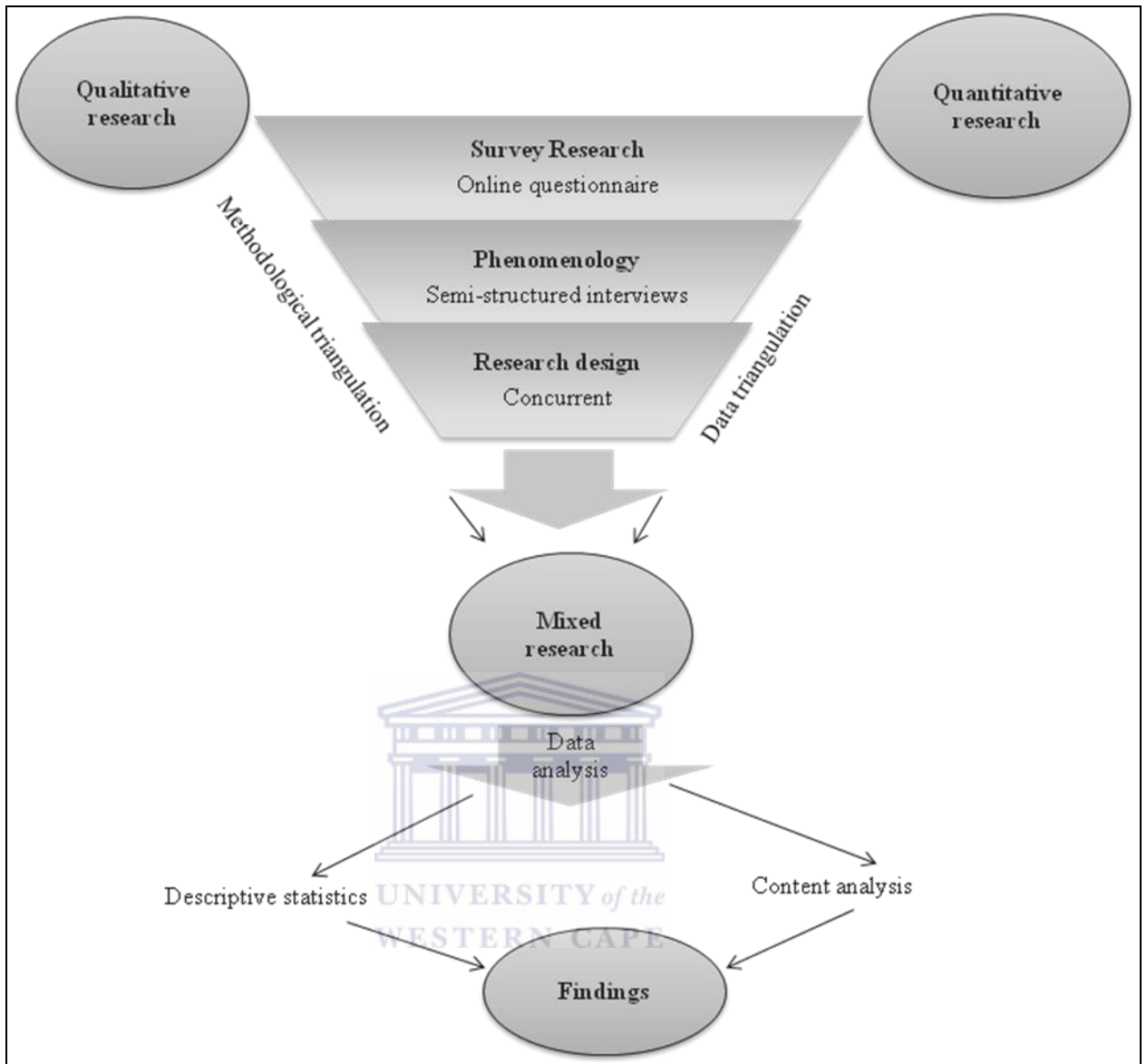


Figure 3-1: Methodological and data triangulation (source: author)

Thurmond (2001) notes that methodological triangulation is often used to describe a study that applies different research designs, that is mixed research method. The term is also used to describe the use of different, often quantitative and qualitative data gathering techniques in a single study (Denzin & Lincoln, 2003).

In the current study, triangulation implies research design, data gathering and analysis triangulation. Triangulation was used to enhance the research process and outcomes (Hanson *et al*, 2005). For example, the online survey collected quantitative data while semi-structured interviews collected qualitative data from HR management. Data analysis was also performed using statistics as well as content analysis.

3.4.8 Concurrent Research Design

Triangulation in mixed method research design could occur in two ways; concurrently or sequentially (Hanson *et al*, 2005). In concurrent design, quantitative and qualitative methods are used to gather and analyse data. In sequential design, methods are applied in succession. This design is time-consuming hence it was not considered suitable for this study. Concurrent designs are relatively faster to implement and are suited to volatile phenomenon hence they were considered plausible for the study (Creswell, 1998).

Figure 3-2 shows how concurrent research design was applied to this study. Hanson *et al* (2005) used upper case and lower case to distinguish between a method that was given high priority and the one given low priority. Upper case means high priority while lower case means low priority. A distinction is therefore made between equal and unequal designs. This study gave priority to quantitative survey research method due to its strength in generating large quantities of data (Matveev, 2002). Qualitative method of semi-structured interviews was given low as it is time consuming (Tashakkori & Teddlie, 2003). The design of this study is therefore QUAN + qual.

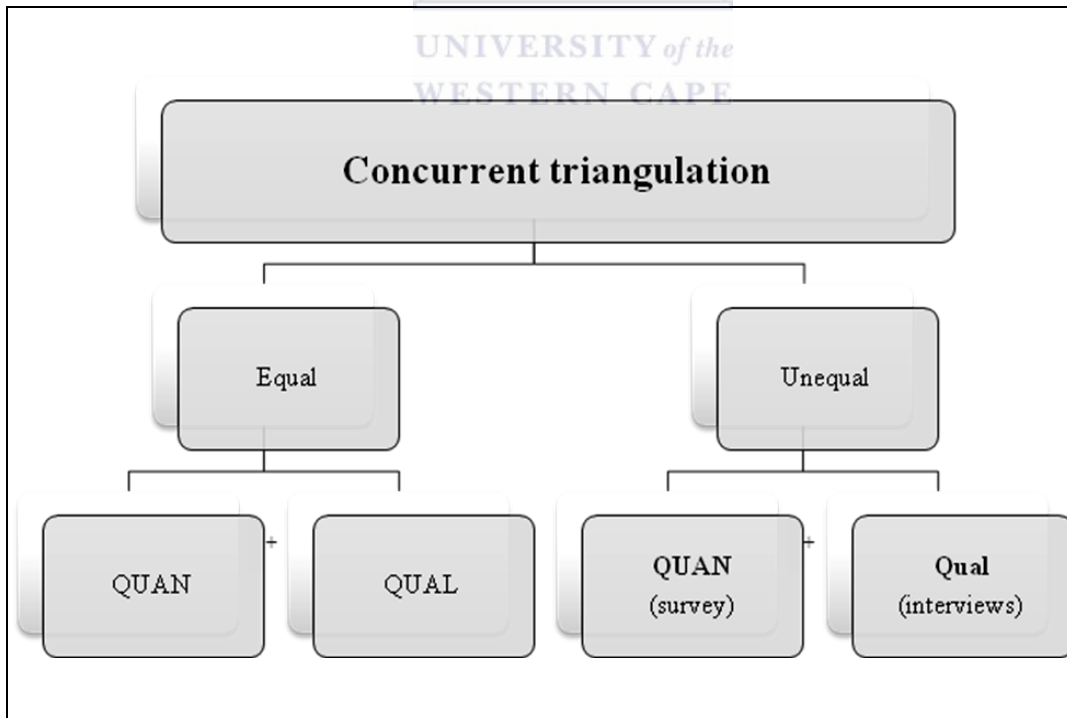


Figure 3-2: Concurrent research design (Hanson *et al*, 2005)

3.4.9 Instruments development

Bazeley (2002) states that mixed methods often combine nomothetic and idiographic approaches in an attempt to serve the dual purposes of generalization and in-depth understanding. This study therefore developed a quantitative online questionnaire order to obtain statistical data for inference and generalisations. Moreover, semi-structured interviews were employed to study in-depth perceptions on data quality, utilisation and usefulness of integrated HRIS (Creswell, 2003).

3.4.9.1 Online questionnaire

Pinsonneault and Kraemer (1993) states that survey research is appropriate when:

- (a) the central questions of interest about the phenomena are "what is happening?", and "how and why is it happening?"
- (b) control of the independent and dependent variables is not possible or not desirable.
- (c) the phenomena of interest must be studied in its natural setting.
- (d) the phenomena of interest occur in current time or the recent past.

Survey research method was therefore deemed appropriate in developing an instrument to answer questions like; *what* are user perceptions of HRIS data quality? For *what* tasks are they using the HRIS? *Why* are they using the system? *What* are the perceptions of HRIS usefulness? *How* satisfied are HRIS users? (Pinsonneault & Kraemer, 1993).

A manual thirty four (34) item, Likert scale-based questionnaire was designed to collect data order to answer above questions. The researcher adopted questions utilised in the User Information Satisfaction survey (Wrigley, Drury & Farhoomand, 1997). These were modified to address an HRIS environment (Hyman, Lamb & Bulmer, 2006). Theoretical foundations uncovered in literature review (chapter 2) were used as input in phrasing and structuring the questionnaire.

The questionnaire was divided into eight (8) sections; Respondent profile, Organisational profile, HRIS profile, Data/information quality, HRIS utilisation, HRIS service, HRIS Usefulness, HRIS satisfaction. Data quality dimensions were also included in the common language understandable by HR personnel. These sections were deemed adequate to obtain data on data quality, system utilisation and perceived usefulness. Moreover, such data could highlight opportunities for further research in HRIS (Ngai & Wat, 2004).

3.4.9.2 Questionnaire refinement

The questionnaire was discussed with a statistician to ensure that the instrument met research objectives, data collection and analysis requirements (Wrigley, Drury & Farhoomand, 1997). Rating scales and questions were rephrased, based on the statistician's advice. For example, the interpretation of validity as a data quality attribute was refined so as to enable consistent responses.

A standard e-mail invitation was drafted. An official letter from the University of Western Cape (UWC) was obtained for the purpose of introducing the researcher and confirming his affiliation with the institution and also the purpose of the research. The letter was attached to the draft participant invitation for distribution to the pilot population. This was done in order to ensure instrument validity, reliability and relevance to the study (Mehra, 2002).

An electronic version of the manual questionnaire was developed in surveymonkey.com. SurveyMonkey provides online questionnaire design and distribution facilities for monthly subscription fee. Their system was selected due to its easy to use functionality and low subscription fees. Data analysis functionality were not utilised due to lack required to learn them. Data was therefore analysed using Microsoft Excel.

The online pilot survey was distributed to 35 respondents via e-mail, to which only 20 responded. The pilot survey revealed that certain questions were misunderstood and therefore answered incorrectly. The questionnaire was further refined for distribution to the main study population. For example, short descriptions of what each data quality attribute meant were incorporated to the questionnaire to aid understanding. Questions about HRIS service satisfaction did not have an option for those responsible for providing HRIS service to business. This option was included as per feedback from pilot study.

3.4.9.3 Preparation for main survey

The researcher prepared for the main survey by creating the online questionnaire from the pilot study. South African ERP implementation case studies that are publicly available were consulted. Case study companies were approached in order to obtain contact numbers and e-mail addresses of potential respondents. Other companies known to the researcher were also contacted in order to source contact details of potential participants.

The total number of potential participant companies was 51. E-mail addresses were also obtained from the researcher's professional contacts. Information-rich potential *informers* were identified with a view that they could refer other respondents (Marshal, 1996). Meetings with potential *informers* were arranged at least four weeks in advance to avoid availability problems.

A standard invitation was further refined to include a short introduction of the researcher, problem (impact of poor data quality) and seeking permission to conduct research (Dillman, 2006). Moreover, a letter requesting permission to conduct research was drafted. This was done to overcome informed consent issues where permission to conduct research at a particular organisation has not been granted (Abareshi & Martin, 2008). The request to conduct academic research was sent HR executives of all potential participant organisations.

3.4.9.4 Semi-structured interview guide

Selection of research methods and data collection instruments takes into account the nature of data required and the availability of resources (Johnson & Onwuegbuzie, 2004). Due to the demanding nature of senior and executive management responsibilities, the online survey method was deemed infeasible (Vicente & Reis, 2007). Senior and executive managers are those who hold positions such as Senior HR Manager, General HR Manager, HR Executive, and Chief HR Officer among others (Lawler, 2005). Qualitative interviews were therefore deemed appropriate in gathering data at this level (Kvale, 1996).

Qualitative research interviews seek to understand the world from the respondents' point of view (Kvale, 1996). Semi-structured interviews provide an in-depth understanding of the phenomenon by way of asking probing questions (Creswell, 2003). They also produce rich qualitative data for analysis (Johnson & Onwuegbuzie, 2004). This has the potential to enhance study findings and subsequent conclusions (Hanson *et al*, 2005).

The two types of interviews commonly used in research are; structured and semi-structured (Tashakkori & Teddlie, 2003). Structured interviews were not utilised in this study since they are restricted to predefined questions (Kvale, 1996). For example, interviewee responses were going to be restricted to the guide and therefore omit any pertinent information. Semi-structured interviews were preferred as they make use of an interview guide. The guide was used to ask open-ended questions so as to elicit required data (Sale *et al*, 1997). This approach helped uncover perceptions about HRIS data quality, utilisation and perceived usefulness.

Qualitative research approaches are often criticised for taking a significant amount of time as both the researcher and/or respondent could deviate from the main point of discussion (Williams, 2007). There are concerns that the researcher and/or the respondent could be biased (Pinsonneault & Kraemer, 1993). For example, the researcher could avoid asking questions that could contradict their strong opinions. Interviewing also requires the researcher to be highly skilled in interviewing techniques (Kvale, 1996). There is also difficulty in organising and analysing data generated by qualitative interviews (Hannabus S, 1996).

In order to overcome limitation of interviewing as a research technique, the study implemented counter-measures. Utilisation of the interview guide ensured that qualitative discussions focused on important aspects of HRIS data quality. The researcher followed interview guide development steps recommended by Kvale (1996) to ensure that it was free of bias. In addition to these guides, the researcher drew on his experience as a business analyst to ensure that interviews yield desired data. The concept of *thematizing* was used to organise qualitative data for content analysis. *Thematizing* identifies broad themes that guide interview discussion.

The semi-structured interview guide for this study was developed using guidelines and techniques discussed above. Interview guide followed a structure similar to the quantitative research instrument in order to ensure consistency. The guide included eight (8) themes summarised in Table 3-1. These themes guided the researcher in asking open-ended questions. For example, to gather data about the respondent, participants were asked to explain their role and background in HRIS. This question revealed their professional background and experience in HRIS.

Theme	Summary
Respondent profile	User role, background and HRIS experience.
Organisational profile	Organisational size and attitudes towards technology
HRIS profile	HRIS history in the organisation, its objectives and user attitudes towards it.
Data/information quality	Data quality attributes with reference to HRIS, intrinsic, contextual, representational and accessibility.
HRIS Utilisation (Use)	Perceptions about HRIS utilisation.
HRIS Service (IT support)	IT support structures and service quality.
HRIS Usefulness (impact)	Perceptions about HRIS usefulness.
HRIS satisfaction (satisfaction)	Satisfaction with IT support and overall system.

Table 3-1: Qualitative interview guide themes (source: author)

3.4.9.5 Qualitative research instrument refinement

The interview guide was piloted with six (6) HR senior managers. The sequence of the questions was revised to produce required data for analysis and interpretation. Interview time was also measured to ensure that key data was obtained during allocated time. Initial interviews took more than 60 minutes. The length of discussions was therefore limited. Insignificant questions were also removed.

An attempt was made to utilise audio recording. It took longer to transcribe recordings for analysis hence the method was abandoned. The researcher resorted to making notes during the interview. Average time for the interview was eventually limited to forty (40) minutes. The guide was therefore deemed adequate to uncover in-depth perceptions of senior management in HR (Dick, 2000).

3.5 Study Population

The selection of a study population and sampling thereof has a significant bearing on data collection, analysis and conclusions (Gibbs, Kealy, Willis, Green, Welch & Daly, 2007). It is therefore important for the research to describe how the population and the sample were selected (Devers & Frankel, 2000).

The population is the entire group of subjects that share similar characteristics relevant to the study. Population *sample* is the subset of the population selected to participate in the study. Sample size is deemed to be representative of the entire population (Gibbs *et al*, 2007). Sampling is the process of selecting individual respondents from a larger population.

Common sampling strategies applied in research are; probability and non-probability (Marshall, 1996). In probability, each possible member of the population has an equal chance of being selected. In non-probability sampling, members of the population do not have equal chances of being selected as the selection is not random. Participants are selected by the researcher (Onwuegbuzie & Collins, 2007).

Non-probability sampling methods include convenience, quota and purposive. Convenience sampling selects members of population that are conveniently available to the researcher. Quota sampling uses quotas to select the predefined number of participants who meet a particular criterion (Marshall, 1996). For example, a researcher may choose to study only ten (10) HR executives within the mining sector.

In accordance with pragmatism, convenient purposive sampling was applied to this study.

Purposive sampling information-rich participants based particular characteristics (Devers & Frankel, 2000). For example, only participants that have HRIS responsibilities were selected for this study. Therefore, non-probability strategies were discarded as they were likely to select participant without relevant level of HRIS involvement (Denzin & Lincoln, 2003). Furthermore, participation was restricted to respondents utilizing ERP-based HRIS at large organisations, operating in South Africa (Ball, 2001)

Another type of purposive sampling applied to this study is snowballing. Snowballing uses informants (who could also be participants) to refer the researcher to other potential participants (Marshall, 1996). The advantage of purposive sampling is that the researcher is able to select information rich participants and informants (Devers & Frankel, 2000). Snowballing ensures that further participants are referred due to their relevance to the study.

Purposive sampling is often criticised for lack of representation and validity (Creswell, 2003). There is also potential bias in terms of who participates on the study. The limitations of purposive sampling were addressed by introducing an element of randomisation in selecting participants from the list of organisations identified. This randomisation was performed in order minimize selection bias (Onwuegbuzie & Collins, 2007).

The population identified for this study followed the Information Manufacturing (IM) process by Wang (1998) as applied in HR. Population was divided into data *originators*, *distributors* and *consumers* were as shown in Table 3-2. Information generators and distributors were included for their involvement in capturing and transforming HRIS data into useful information. Their perceptions of data quality, system utilisation and usefulness were critical in understanding causal relationships among these variables. Data consumers who are typically in managerial roles were included in order to understand their perceptions of these variables.

IMP Role	Typical Title	Typical HRIS Role
Generator	Payroll/HR Administrator	Captures and updates payroll data.
	HR Practitioner/Officer	Captures and updates employee data.
Distributor or Manufacturer	HR Business Analyst	Extracts and analyses employee data
	HRIS Specialist	Maintains HRIS settings
	HR Consultant	Extracts, analyses and reports
	HR Business Partner	Extracts, analyses and reports
	HRIS Developer	Creates and edit reports.
Information Consumer	HR Executive General HR Manager	Views summary reports for compliance and/or strategic planning.

Table 3-2: Survey participants and typical roles (source: author)

3.6 Research instrument administration

3.6.1 Online survey research instrument

The online questionnaire was distributed as web link via e-mail to 105 potential respondents in November 2009 (Amaratunga *et al*, 2002). In order to overcome low response rates, four (4) follow-up messages were sent to respondents from the date of the initial e-mail (Dillman, 2006). E-mail invitations were also sent as text where firewall configurations could not be confirmed (Vicente & Reis, 2007). This was done in order to ensure that invitations are not interpreted as spam e-mail and hence blocked by e-mail servers (McElroy, 2003).

The target population for the study were Human Resources as well as IT personnel responsible for HRIS at their organisations. Survey e-mails were accompanied by an approval letter from the University of Western Cape, department of Information Systems. The letter identified the researcher and objectives for data collection. The survey was closed in April 2010 to enable sufficient data analysis and timely submission of study findings.

The survey link was e-mailed directly to potential respondents whose e-mail addresses were available. In instances where direct respondents' e-mail addresses were not available, the survey was sent to potential managers in HR and IT (informers). The managers subsequently distributed to their personnel, a strategy called snowballing (Marshall, 1996). This method of working through management ensured representation of the sample population and improved response rates (Baruch, 1999).

3.6.2 Semi-structured interview guide

Semi-structured interview guide was administered through personal interviews with senior and executive HR managers. Appointments were made at least four (4) weeks in advance with personal assistants of identified managers. Telephonic conversations were held with managers where it was possible; to build relationship and rapport (Hannabus, 1996).

The interview guide, together with research approval letter was e-mailed to interviewees at least one (1) week in advance. All interviews were held at the interview premises. Building access and parking arrangements were made by interviewee personal assistants at least three (3) days in advance. The interviews began with a brief introduction of the researcher, the topic and a summary of the themes. The researcher acted as time-keeper.

3.7 Data Gathering

3.7.1 Data Collection Design

Primary and secondary data was collected using a data triangulation approach (Onwuegbuzie & Collins, 2007). Qualitative semi-structured interviews and a quantitative online questionnaire were employed concurrently. This data collection method provided simultaneous sources of data for analysis and interpretation (Hanson *et al*, 2005).

Quantitative and qualitative data gathering methods were given unequal priorities as shown in figure 3-3. Quantitative methods were given high priority due to their potential in collecting large amounts of data (Creswell, 2003). Less priority was given to qualitative interviews as they are time consuming and costly (Hannabus, 1996). Therefore, data collection triangulation was applied to the study. Quantitative method was selected for gathering primary data for the study.

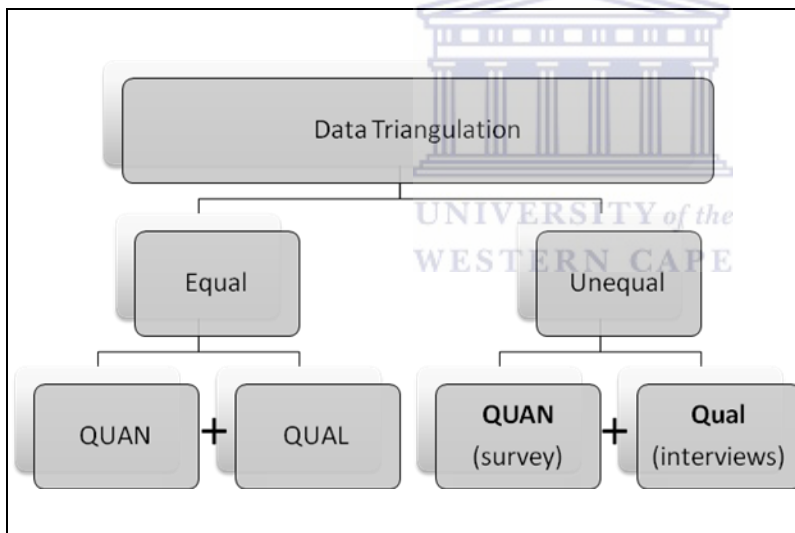


Figure 3-3: Concurrent data triangulation (Hanson *et al*, 2005)

3.7.2 Data collection procedures

The key to data gathering design is to link collection methods to the target population (Denzin & Lincoln, 2003). Table 3-3 summarises IM roles, typical job titles of the sample population and data gathering method used. Data collected from each participant was organised for analysis in chapter 4.

IMP role	Typical title	Data gathering method
Generator	Payroll/HR Administrator	Online Survey
	HR Practitioner/Officer	Online Survey
Distributor or	HR Business Analyst	Online Survey
	HRIS Specialist	Online Survey
Manufacturer	HR Consultant	Online Survey
	HR Business Partner	Online Survey
	HRIS Programmer/Developer	Online Survey
Information Consumer	HR Executive, HR Manager	Semi-structured Interview

Table 3-3 : Participants and data gathering methods (source: author).

3.7.3 Quantitative data collection

Quantitative data was collected through the online questionnaire (Amaratunga *et al*, 2002). Respondents accessed the link sent to them via e-mail and completed the survey. The researcher accessed the survey portal on a daily basis to view responses and identify trends. The in-built surveymonkey.com analytical tools provided high level insights into the data as it was being collected. Signs of poor response were also identified and subsequent reminders were sent to potential respondents. The researcher made telephone calls to identified informants, reminding them to refer further potential respondents (Czaja & Blair, 2005).

Questionnaire responses were downloaded regularly from surveymonkey.com for safekeeping and statistical modelling. Responses were downloaded in CSV file format which is compatible with Microsoft Excel. The survey was subsequently closed, indicating the end of data collection phase. Responses for key study variables (data quality, utilisation and usefulness) were sorted for analysis.

3.7.4 Qualitative data collection

Qualitative data was gathered by means of semi-structured interviews as shown in table 3-3. Interviews were scheduled at least four (4) weeks in advance. The interview guide was also attached to the e-mail invitation so to allow interview a chance to topics to be discussed (Carruthers, 2007). The recording method used was transcribing as it was deemed more efficient. Moreover, the researcher could capture most relevant part of the conversation. Other recording methods capture all, including irrelevant information. It also allowed the research to further details from follow-up questions (Opdenakker, 2006).

After each interview, the researcher transcribed notes onto Microsoft excel for analysis and interpretation. This process is often called *memoing* where the interviewer records, not only the interview conversation by also impressions thereof. The process allows analysis of the data at the time of transcription (Elliott & Lazenbatt, 2005). Trends emerging from the data were compared to those emanating from quantitative data (Merriam, 2002). This practice helped the researcher to adapt questions in response to trends resulting from online survey and previous interviews (Denzin & Lincoln, 2005).

3.8 Data coding and analysis

Data coding could be interpreted as a systematic way to condense extensive data sets into smaller, analyzable units by creating categories and concepts derived from the data (Lewis-Beck, Bryman & Liao, 2004). The key to designing a coding scheme is that it must be simple for others to understand, interpret and apply (Basit, 2003). Coding is therefore necessary in order to analyse, interpret and draw conclusions from research data.

For analysis purposes, a distinction was made between primary and secondary data (Onwuegbuzie & Leech, 2006). In the context of this study, primary data refers to data that relates to main study objectives, that is data quality, utilisation and usefulness of HRIS. Secondary data refers to other factors that are deemed important in the context of study objectives and as such could enrich research findings (Creswell, 2003).

In order to enable quantitative and qualitative data analysis, the study adopted a *priori* coding system by defining broad data codes upfront. The coding scheme was based on key research variables. The *priori* system was chosen in order to retain focus on key research themes (Marshall & Rossman, 2006). Study readers can therefore understand, interpret and replicate the scheme (Stemler, 2001). Another reason for using *priori* coding was to prepare for *deductive analysis*. Deductive analysis is driven by data that is required to meet research objectives (Denzin & Lincoln, 2005).

The scheme therefore used the first four (4) characters of the research variable. For example, data quality is represented by the code QUAL. The same convention is applied to system utilisation, which is represented by UTIL. The fifth (5) character is used as a tie-breaker where two variable codes could use the same code. The tie-breaker could also be used to give meaning to the data code.

3.8.1 Quantitative data

The coding scheme used ideal language used by potential respondents in order to improve study validity and reliability (Gibbs *et al*, 2007). In accordance with *priori* coding scheme, Table 3-4 shows how coding was applied to the survey questionnaire. The data quality variable is represented by QUAL (Strong *et al*, 1997). Information system utilisation is represented by UTIL (Seddon, 1997). Perceived system usefulness is represented by USEF (Davis, 1989). HRIS service quality is represented by SERV (Ifinedo, 2006). Lastly; satisfaction with HRIS is represented by SATI. These codes were deemed necessary to enable statistical analysis of research data.

Survey question phrase	Dimension	Code	
Data accuracy	Intrinsic Data Quality	QUAL	
False entries			
Ease of access	Accessibility Data Quality		
Data security	Contextual Data Quality		
Outdated data			
Relevant data			
Ease of understanding	Representational Data Quality		
Same data captured differently			
Utilisation	Perceived HRIS Utilisation		UTIL
Usefulness	Perceived HRIS Usefulness		USEF
HRIS Service	Satisfaction with HRIS IT services	SERV	
Satisfaction	Satisfaction with HRIS	SATI	

Table 3-4: Quantitative data coding method (source: author).

3.8.2 Qualitative data

In preparation for *deductive analysis*, qualitative data was not coded. This decision was made in order to preserve meaning and context of interview transcripts (Creswell, 2003). Interview guide themes were deemed adequate since qualitative data was not analysed statistically (Sandelowski, 2001). Statistical analysis of qualitative data, called *quantisizing* is often criticised for depriving data of its original meaning (Johnson & Onwuegbuzie, 2004). Therefore, interview guide themes were adopted as a coding scheme for qualitative data analysis (Gibbs *et al*, 2007). However, in keeping with *pragmatism*, qualitative data was *quantisized* where appropriate (Onwuegbuzie & Leech, 2006).

3.9 Reliability and validity

Without rigor, research is worthless, becomes fiction, and loses its utility. Hence, a great deal of attention is applied to reliability and validity in all research methods (Morse, Barret, Mayan, Olson & Spiers, 2002). Joppe (2000) defined reliability as the extent to which results are consistent over time and an accurate representation of the total population under study.

Moreover, the research instrument is considered reliable if its results can be reproduced under a similar methodology. Therefore, for this study's conclusions to be valid and reliable, independent observers should be able to replicate research procedures that yield consistent results (Howell *et al*, 2005).

Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are (Golafashani, 2003). Validity could be categorised as *internal* and *external* validity. External validity refers to the extent to which the results of a study are generalizable (Howell *et al*, 2005). Internal validity refers to (1) the rigor with which the study was conducted and (2) the extent to which alternative explanations for any causal relationships are considered (Huitt, 1998, cited in Howell *et al*, 2005).

Denzin and Lincol (2005) suggest that reliability and validity of a study is governed by the lens the researcher chooses and his/her paradigm assumptions. Furthermore, a multiple approach to validity and reliability was necessary since the study applied a mixed method. The researcher therefore selected quantitative and qualitative methods to ensure rigor (Sandelowski, Voils & Barroso, 2006).

The choices made by the researcher to ensure rigor are marked with an asterisk (*) in table 3-5. The table shows that the researcher's theoretical lens was used to ensure credibility for both quantitative and qualitative studies. Triangulation (validity) and Cronbach's alpha (reliability) were employed to ensure rigor (Marshall & Rossman, 2006). Triangulation (validity), combined with researcher responsiveness and reflexivity were employed. Thick descriptions and peer debriefing was used to ensure research credibility from the perspective of people outside the study (Creswell & Miller, 2000).

Assumption	Quantitative study		Qualitative study	
	Paradigm	Technique	Paradigm	Technique
Researcher	Triangulation (method, analysis)	*Cronbach alpha *Purposive sampling *test-retest	Triangulation (method, data, analysis)	*Researcher responsiveness *Purposive sampling
People external to the study		Peer debriefing		*test-retest *Thick description

Table 3-5: Lens to achieve study rigor (Creswell & Miller, 2000)

3.9.1 Reliability and validity of quantitative methods

Purposive sampling was employed to ensure representativeness of quantitative data. The snowballing methods ensured that only knowledgeable respondents were referred. This increased reliability of the data (Matveev, 2002). Moreover data analysis triangulation was employed by comparing survey data with interview responses (Opdenakker, 2006). The data collection instrument was also discussed with a statistician for relevance and completeness. The research instrument was also reviewed by research supervisor, a method called *peer debriefing* (Golafshani, 2003). A pilot study was also conducted in order to ensure instrument reliability (Amaratunga *et al*, 2002).

It could be almost impossible to adhere to all strategies for ensuring study rigor. There researcher therefore makes such choices as to which strategies to apply (Morse *et al*, 2002). The researcher selected cronbach's alpha as a measure of ensuring research instrument reliability (Gliem & Gliem, 2003). This measure was used due to its prevalence in quantitative studies (Zimmerman & Zumbo, 1993).

The formula used to calculate Cronbach's coefficient alpha (α) is shown below where;

n =number of questions

V_i =variance of scores in each question

V_{test} =overall variance of scores in the entire questionnaire

$$\alpha = \frac{n}{n-1} \left(1 - \frac{\sum V_i}{V_{test}} \right)$$

Formula 3-1: Cronbach's coefficient alpha

Chapter 4 (Data analysis and interpretation) describes how the coefficient was calculated for data quality related questions to ensure internal consistency. Coefficient alpha values between 0.5 and 0.9 were considered sufficient since they indicate high level of internal consistency. The study further ensured internal consistency by making reference to data quality in the language the participants is familiar with (Denzin & Lincoln, 2005). For example, the online questionnaire used terms such as "false data" instead of invalid data.

The study addressed other forms of validity as necessary. Face validity is concerned with how a measure or procedure appears. Face validity does not depend on established theories as it is the case with construct validity (Fink, 1995, cited in Howell *et al*, 2005). The researcher was therefore at liberty to address face validity in the most appropriate manner for the study.

Face validity of research instruments was met by structuring both instruments according to the criteria being measured, that is, data quality, system utilization and usefulness.

Criterion validity is used to demonstrate the accuracy of a measure or procedure by comparing it with another measure or procedure which has been demonstrated to be valid (Howell *et al*, 2005). The study ensured criterion validity by adapting the User Information Satisfaction (UIS) instrument to the HR environment (Wrigley *et al*, 1997). The UIS has been tested and found to meet requirements for instrument validity (Haines & Petit, 1997).

Construct validity seeks agreement between a theoretical concept and a specific measuring procedure (Howell *et al*, 2005). The study addressed construct validity by designing data collection instrument to measure impact of perceived data quality on system usage and perceived usefulness. The instrument was designed as per theoretical framework established from literature (Gable *et al*, 2003, DeLone & McLean, 2003).

Content validity is based on the extent to which a measurement reflects the specific intended domain of content (Carmines & Zeller, 1991, cited in Howell *et al*, 2005). The research instruments addressed domains of data/information quality, system usage, user satisfaction, IT service and usefulness, thus ensuring content validity (Khalifa & Lui, 2003; Seddon, 1997; Strong *et al*, 1997).

3.9.2 Reliability and validity in qualitative methods

Rigor of qualitative methods was ensured using techniques shown in table 3-5. A peer debriefing session was held with a statistician. Moreover, the research supervisor reviewed the interview guide, providing further refinements. The researcher further tested reliability of the interview guide by conducting a pilot study (Morse *et al*, 2002). The pilot study involved qualitative interviews with HR management and analysis of responses. This was used to modify interview guide and adjust session duration (Dick B, 2000).

During the interview process, the interviewer remained aware of personal biases such as extensive experience in the use of the integrated HR systems, knowledge of system usage behaviours and general perception about HRIS usefulness (Creswell, 2003). The researcher also adapted interview questions to understand trends emanating from quantitative data (Denzin & Lincoln, 2005).

A thick descript approach was adopted to ensure study credulity (Golafshani, 2003). A mixed method was applied in the design, data collection and analysis phase of the study. Purposive sampling ensured that the researcher selected information-rich participants. This was further augmented by snow-balling technique where further knowledgeable respondents were referred by informants (Devers & Frankel, 2000). Data was collected through semi-structured interviews (Carruthers, 2007).

The target population for qualitative interviews were HR senior managers. This group predominantly reported to the Chief Executive Officer (CEO). The researcher took notes during the interview and transcribed these into Microsoft Excel. Microsoft Excel was used to analyse data. Inductive approach was used to analyse data as per theoretical framework. Moreover, a deductive approach was incorporated to analyse emerging themes and disconfirming evidence (Creswell & Miller, 2000).

3.10 Bias

Research aims to reach valid conclusions through scientific enquiry. This aim could be achieved if bias is minimized or eliminated (Dunn, Lyman & Marx, 2003). Bias is any effect in the design, data collection, analysis, interpretation, publication or review of data that can lead to conclusions that are systematically different from the truth (Vermooten, 2006). It is difficult or even impossible to completely eliminate bias. Therefore, the goal is to minimize bias for both investigators and readers to comprehend its residual effects, limiting misinterpretation and misuse of data (Sica, 2006). This study addressed limited types of systematic bias that could affect conclusions, that is sampling, researcher and confounding.

Sampling bias is related to the manner in which study participants are selected (Vermooten, 2006). Sampling bias results in selection of participants that are not representative of the study population. Using sampling reference described in this chapter, the study minimised sampling bias by using purposive sampling and snowballing methods. The researcher selected information rich participants and knowledgeable informants to refer other representative participants (Devers & Frankel, 2000; Marshal, 1996).

Researcher bias is related to the influence of the researcher's preferences, beliefs, values and political affiliations on the research process and findings (Mehra, 2002. p.6). In qualitative studies, researcher bias could also be referred to as interviewer bias. This form of bias results in rejection of views, practices and findings that are contrary to researcher's standpoint in order to favour the researcher (Kvale, 1996). The study minimised researcher/interviewer bias by using interviewers that were not part of the research in collecting qualitative data. Study findings were also compared to previous findings in the HRIS environment.

Confounding bias arises where external variables influence the study phenomenon (Vermooten, 2006). This form of bias results in misinterpretation of causal relationship due to the influence of confounding variables. The study minimised this form of bias by including known confounding variables in instrument design (Dunn, Lyman & Marx, 2003). Known confounding variables are; participant's role, number of year in HR systems, formal training and Involvement in HRIS implementation. Research data was first analysed with confounding variables included. Confounding variables were later excluded in order to understand their impact.

3.11 Ethical considerations

Kvale (1996) states that issues such as informed consent, confidentiality and consequences for participation must be considered in every qualitative research. An approval letter from the University Of Western Cape accompanied all invitations to prospective participants. The letter included contact details for participants to obtain further information. Informed consent was assumed to have been granted by virtue of respondents completing the online questionnaire. The same assumption was applied to those who accepted e-mail and telephonic invitations for qualitative interviews (Creswell, 2003).

The online survey tool utilised, surveymonkey.com was configured not to store respondents' Internet Protocol (IP) addresses in order to ensure confidentiality. The questionnaire and the interview guide did not provide for recording of respondents' name nor their employer (Hannabus, 1996). Potential participants who declined invitations remained anonymous and were counted for transparency purposes (Abareshi & Martin, 2008).

3.12 Chapter summary

This chapter discussed the study design and data collection employed in exploring the impact of perceived HR data quality, system usage, and perceived usefulness of integrated HRIS. The population and sample reference was explained in order to define study boundaries. Design and purification of research instruments was also explained. Purification included manner in which input from pilot studies was incorporated into the final data collection instruments. Administration of Research instruments was discussed. The chapter also discussed study validity, reliability, bias and ethical considerations in preparation for data analysis and interpretation.

The next chapter (**Chapter 4** – Data analysis and interpretation) focuses on data coding and application of statistical methods to analyse primary and secondary data. The chapter begins by listing and explaining key variables of the study and survey instrument reliability. Statistical Correlations between variables are examined. Key findings emanating from data analysis are summarised and management implications explained.



4 Chapter 4: Data analysis and interpretation

4.1 Introduction

The objective of this study was to evaluate the impact of data quality on utilisation and usefulness of HRIS. Chapter 3 described the research design and suitability of selected methods in meeting study objectives. The development and administration of data collection instruments was discussed in detail. Suitable population sampling strategies were also discussed. Data coding and analysis approach was also outlined. A distinction was made between primary and secondary data analysis. The previous chapter described how reliability, validity, bias and ethical considerations were addressed to enhance research credibility.

This chapter presents the results of the empirical study. The first part begins with general analysis of the demographic control variables. This is followed by discussion of how the study achieved reliability. Detailed quantitative analysis of primary and secondary which includes regression and correlation models is presented. Qualitative analysis of interview data is discussed. Study findings are described in detail, together with implications for management. A brief chapter summary is provided, as well as a short introduction to the next chapter.

4.2 Demographic analysis

4.2.1 Quantitative responses

4.2.1.1 Primary role in HRIS

The online survey instrument was distributed via e-mail to 105 potential respondents, of which 71 responded thus achieving a response rate of 67%. The majority of respondents, 33.8% were responsible for capturing and editing data in HRIS. The other 33.8% were responsible compiling and distributing HR reports. Second to these groups were those who consume data from HRIS at 22.5%. The last group of respondents came from HRIS support resources, who constituted 9.9% of responses. These figures show that from an operational perspective, the sample population was sufficiently representative (Abareshi & Martin, 2008).

Figure 4-1 graphically depicts these groups of respondent. As it can be seen from the graph, the highest number of responses came from information generators as well as distributors. The least number of responses came from HRIS technical resources. This cannot be viewed as a discrepancy since generators and distributors are in better position to judge the quality of

information directly coming out of the HRIS. On the other hand, HRIS resources are independent observers of data quality since they setup the system functionality and develop reports to extract data. From this perspective, the study could therefore be deemed representative.

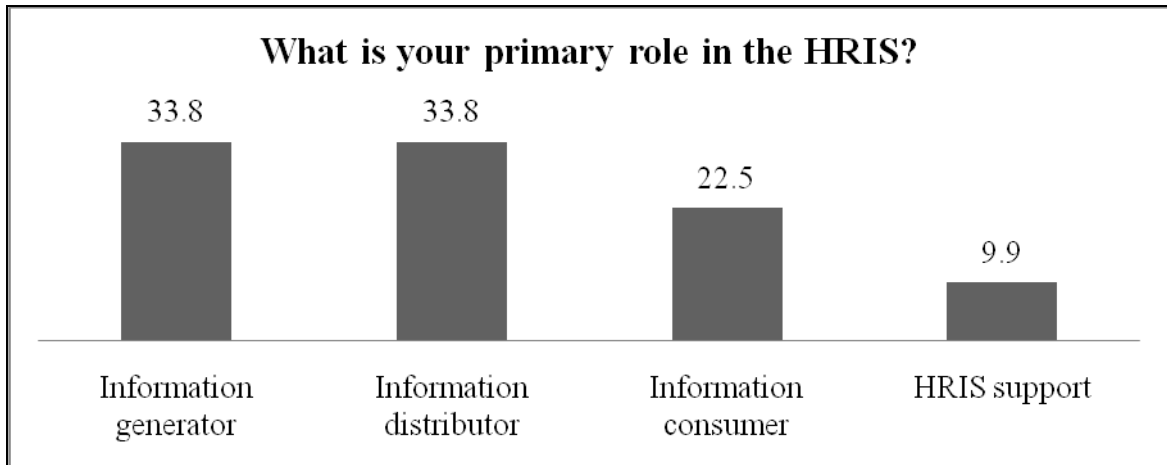


Figure 4-1: Study demographics by role (source: author)

4.2.1.2 Level of participant role in the organisation

When asked about their role, 50% of respondents indicated that their role was operationally focused. Figure 4-2 shows respondents according to the level of their role in the organisation. A significant number of respondents were middle managers (26%). Senior and executive management options were included to accommodate referrals by informants (Marshal, 1996).

As expected, there was an insignificant percentage of senior management (5.8%) and no executive respondents. The presence of operational personnel responses should reveal notable perceptions at the lower levels of the organisation (Ball, 2001). Middle and junior managers could provide useful input as they are expected to make informed decisions based on HRIS data.

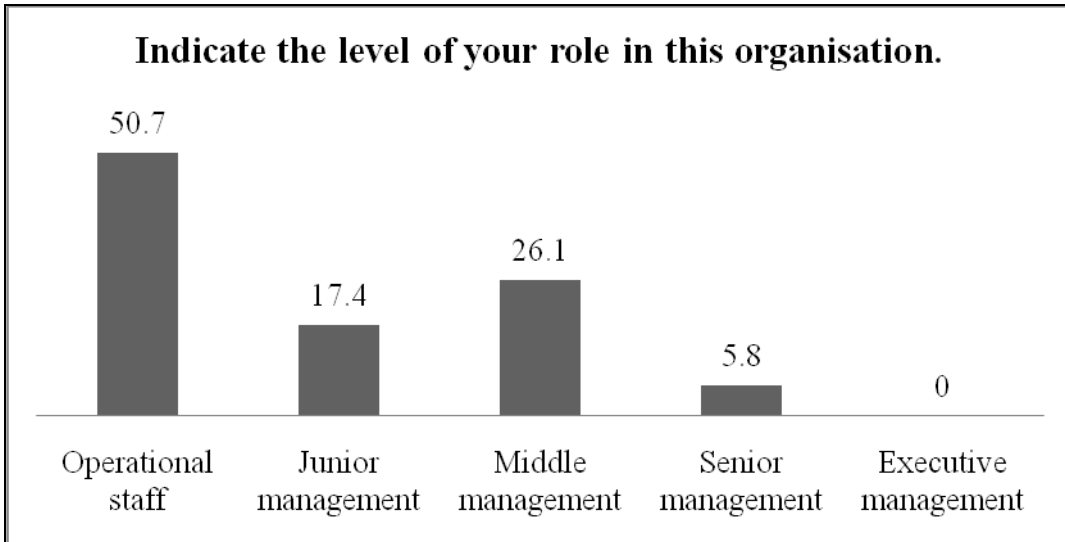


Figure 4-2 : Respondents by organisational staff level (source: author)

4.2.1.3 Number of years in HRIS

Figure 4-3 shows that the majority (37%) of respondents to the online survey had been working in the HRIS environment for 1-5 years. This is followed by 25% of respondents with 6-9 years, while 22.4% had 10-15 years of experience. A number of respondents had 16-20 (13.4%) and more than 20 (1.5%) years of experience respectively. The 1.2% of respondents with more than 20 years of experience confirms that HRIS is still developing as a profession, especially in the ERP environment (Voermans & Veldhoven, 2007).



Figure 4-3: Study demographics by years of experience in HRIS (source: author)

4.2.1.4 Industry sector in which organisation operates

From an industry perspective, responses were evenly spread, thus confirming that the target population was adequately representative. In figure 4-4, respondents per industry sector were as follows; mining (13.8%), financial services - insurance (12.3%), government (12.3%), education (10.8%), retail (10.8%), manufacturing (7.7%), utilities (7.7%), telecommunications (6.2%), financial services - banking (6.2%), Other (4.6%), petrochemicals (4.6%) and professional services (3.1%).

The data in figure 4-4 appears to be consistent with Muscatello and Parente (2006) who noted that early ERP implementations had focused on manufacturing and financial processes. This focus on production and financial management could have led to the exclusion of HR since competitive advantage was often interpreted in terms of profits (Porter, 2001).

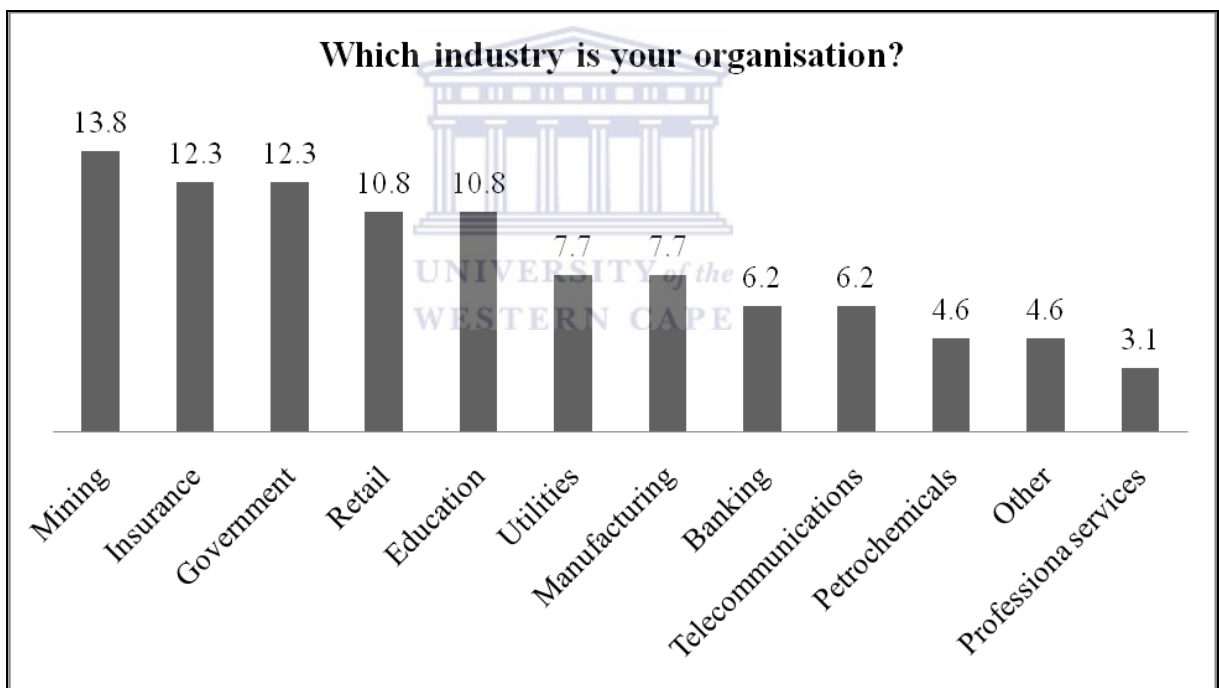


Figure 4-4: Study demographics by industry type (source: author)

4.2.1.5 Number of employees managed by HRIS

In figure 4-5, almost half of respondents (45.2 %) indicated that their organisations employ between 4000-6000 employees. This is also consistent with the objectives of the study as it sought to investigate large organisations. Moreover, the data confirms findings by Muscatello and Chen (2008) who found that integrated solutions were being adopted by medium-size organisations.

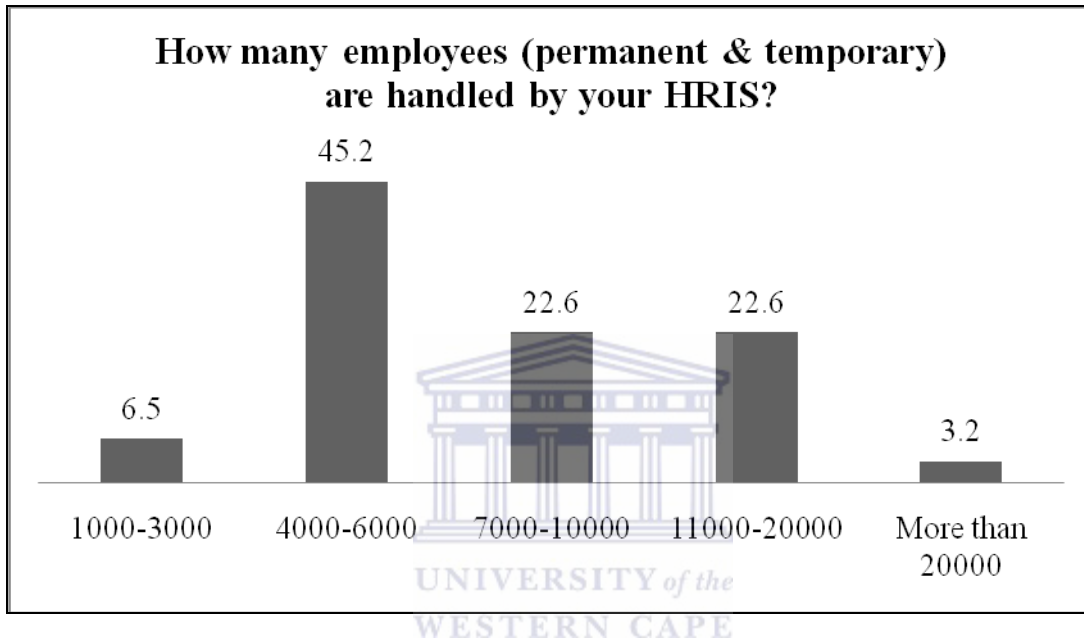


Figure 4-5: Study demographics by organisational size (source: author)

4.2.1.6 Age of the HRIS in the organisation

More than half (54%) of surveyed organisations had been using the HRIS for 6-10 years. This was followed by 28.6% who had been using the HRIS for 11-20 years. Figure 4-6 shows that none of the respondent's organisations have been using the HRIS for more than 20 years. This however does not imply that there was no HR information system in these organisations. HR information system could have existed as disparate systems focusing on payroll, timesheet, training, recruitment and other functional processes (Kossek *et al*, 1994; Kovac & Cathcart, 1999).



Figure 4-6: Study demographics by HRIS age (source: author)

4.2.2 Qualitative responses

In addition to the online survey, semi-structure interview invitations were sent to twenty five (25) HR senior and executive managers. Executives are those who report to the Chief Executive Officer (CEO). Senior Managers are those who report to the HR executive. Fifteen (15) of potential interviewees accepted the invitation. Twelve (12) interviews were held while the other three (3) were subsequently cancelled by potential interviewees. Only three (3) HR Executives were interviewed, the rest were senior managers. A higher percentage (56%) of senior HR managers perceives their HR data to be of acceptable quality. However, 30% of them believe that data might have been manipulated to remove discrepancies before it is presented to them.

4.2.3 Instrument reliability

Reliability is the ability of an instrument to accurately and consistently measure the underlying construct (Howell *et al*, 2005). Cronbach's coefficient alpha (α) was used to measure the reliability (internal consistency) of the online research instrument. Three dimensions of interest were perceived data quality (QUAL), system utilisation (UTIL) and usefulness (USEF). The coding scheme defined in the previous chapter was applied to enable data analysis. The formula used to calculate Cronbach's coefficient alpha (α) is shown below where;

n =number of questions

V_i =variance of scores in each question

V_{test} =overall variance of scores in the entire questionnaire

$$\alpha = \frac{n}{n-1} \left(1 - \frac{\sum V_i}{V_{test}} \right)$$

Cronbach's alpha reliability coefficient ranges between 0 and 1. However, there is no lower limit to the coefficient. The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale (Gliem & Gliem, 2003). Coefficient alpha values between 0.5 and 0.9 were considered sufficient since they indicate high level of internal consistency.

4.2.4 Online survey questionnaire

4.2.4.1 Data quality

In order to obtain an in-depth understanding of data quality, questions focused on quality dimensions as described by Strong *et al* (1997). Chapter 2 discussed such dimensions and categories in detail. Individual questions were based on each quality attribute, for example, consistent representation of data. The survey questionnaire is presented in the appendices (Section 7.2.1). The study explored data quality as a single variable (QUAL); therefore it was necessary to summarize responses to enable concise analysis (Vicente & Reis, 2007). Table 4-1 shows the summary of percentage responses for data quality categories and dimensions.

Data quality category	Data quality dimension (survey phrase)	Response (%)			
		High	Medium	Low	I don't know
Intrinsic	Believability (false)	4.9	31.1	60	33.3
	Accuracy (incorrect)	13.1	55.7	29.5	1.6
Accessibility	Ease of accessing (ease of access)	26.7	0	70	3.3
	Security (unauthorized access)	13.1	4.9	44.3	37.7
Contextual	Timeliness (outdated)	78.7	8.2	11.5	1.6
	Completeness (incomplete)	73.8	16.4	8.2	1
	Value-added (usefulness)	75	0	25	0
	Consistency (inconsistent presentation)	39.3	41	13.1	6.6

Table 4-1: Online survey responses for data quality dimension (source: author)

Variables for calculation of Cronbach's alpha for QUAL measurement were as follows:

$n = (11)$ number of questions

$V_i = (0.59)$ variance of scores in each question

$V_{test} = (0.69)$ overall variance of scores in the entire questionnaire

$\alpha = 1.265 (1.0)$

Summarised responses for each data quality category are shown in table 4-1. This level of data summarisation enabled statistical calculation of the survey instrument's reliability. Calculation of Cronbach's α based on table 4-1 shows a value of 1.0, thus indicating high internal consistency. An alpha value of this magnitude confirms the reliability of the data quality measurement for subsequent analysis and conclusions.

4.2.4.2 HRIS utilisation

System utilisation dimension was measured by asking user if they would continue using the HRIS if its utilisation was optional at their organisations. Variables for calculation of Cronbach’s alpha for UTIL measurement were as follows:

$n=$ (4) number of questions

$V_i=$ (0.36) variance of scores in each question

$V_{test}=$ (0.54) overall variance of scores in the entire questionnaire

$\alpha =$ 0.452 (0.5)

The results from the online survey are shown in table 4-2. Calculation of Cronbach’s α based on table 4-2 shows a value of 0.5, thus indicating an acceptable level of internal consistency. An alpha value of this magnitude confirms the reliability of perceived HRIS utilisation measurement for subsequent analysis and conclusions.

Interview question	Response	Percent
<i>If the utilization of the HRIS was OPTIONAL in your organization, would you continue using it?</i>	Yes	93.3
	No	5
	I don’t know	1.7

Table 4-2: Responses for system utilisation dimension (source: author)

4.2.4.3 HRIS usefulness

HRIS usefulness was measured by asking users if they thought the HRIS was a useful business tool for the organisation (see questionnaire in 7.2.1). Variables for calculation of Cronbach’s alpha for USEF measurement were as follows:

$n=$ (5) number of questions

$V_i=$ (0.36) variance of scores in each question

$V_{test}=$ (0.78) overall variance of scores in the entire questionnaire

$\alpha =$ 0.675 (0.7)

The results from the online survey are shown in table 4-3. Cronbach's α was calculated using figures from table 4-3. A coefficient value of 0.7 was found, thus indicating high internal consistency. An alpha value of this magnitude confirms the reliability of perceived HRIS usefulness measurement for subsequent analysis and conclusions.

Interview question	Response	Percent
<i>Do you think the HRIS is a USEFUL business tool for your organisation?</i>	Yes	89
	No	8.9
	I don't know	1.8

Table 4-3: Responses for system usefulness dimension (source: author)

The high value of Cronbach's coefficient alpha (α) indicated that the results of this study on data quality, system utilisation and usefulness could be expected to be repeatable. This will be due to the fact that the survey instrument (questionnaire) consistently measured key variables required to meet research objectives. The research question being: *What is the impact of perceived data quality on system utilisation and perceived usefulness?*

4.2.5 Semi-structured interview guide

A test-retest approach was employed in establishing reliability of the qualitative interview guide (Flick, 2002). The guide was designed and piloted in the researcher's place of employment and nearby organisations. A pilot study invitation was sent to eight (8) potential respondents. A total of five (5) pilot interviews were held due to non-response and late cancellation by potential respondents. Observations transcribed from responses and respondent feedback was incorporated in the final interview guide provided in appendices (7.2.2) of this study (Hannabus, 1996).

4.2.5.1 Data quality

Reliability of the data dimension was assessed by repeating the interview questions to several respondents during the pilot phase. It appeared that the *validity* dimension was not adequately understood hence interpreted in the same way as *accuracy*. This resulted in diverse responses that were not close to evaluating the dimension. The question was particularly explained in subsequent interviews, thus yielding more consistent responses (Kvale, 1996). The same

approach was applied to the holistic view of data quality, apart from *accuracy*. Study findings revealed that this concept is not well understood by HR personnel at all levels.

4.2.5.2 Utilisation

HR senior managers were asked if they thought the HRIS was used volitionally or by mere compliance to organisational rules and regulations. This question was answered consistently across all industries and levels of management. Responses to the question were mostly positive. However, participants mentioned that there were individuals who were against the system (Ball, 2001). The consistency of the responses therefore confirmed that the research instrument was measuring the same phenomenon across all participants (Morse *et al*, 2002).

4.2.5.3 Usefulness

Respondents were asked if they perceived the HRIS as a useful business tool. Each respondent was asked to justify their response, regardless of where it was positive or negative. For example, a manager who perceived the HRIS as useful would mention that their reporting cycle has been significantly reduced due to the HRIS. The consistency of such responses in the pilot and main study confirmed the instrument's reliability (Denzin & Lincoln, 2005).

4.2.6 Quantitative data analysis

Linear regression models were applied to online survey responses so as to predict the relationship that could exist between data quality, system utilisation and usefulness. Pearson's statistical correlation formula (formula 4-1) was used to analyse and interpret the relationships shown in regression models. The analysis commenced with the regression table for data quality and system utilisation. This was done in order to understand the possible tendency of the relationship (DeLone & McLean, 2003).

$$r = \frac{\sum(x - \bar{x})(y - \bar{y})}{\sqrt{\sum(x - \bar{x})^2 \sum(y - \bar{y})^2}}$$

Formula 4-1: Pearson's correlation coefficient.

Furthermore, a regression model for system utilisation and usefulness was analysed. The analysis served to determine the relationship between data quality and system usefulness. A regression model depicting the relationship between data quality, utilisation and usefulness was also formulated. The intention was to establish any possible chain-reaction that data quality could have on utilisation and usefulness. The final model evaluated service quality against user satisfaction. Service quality was expected to positively influence user satisfaction (Ifinedo, 2006).

The relationship between perceived data quality and system utilisation was expected to be positive and strong, with a correlation coefficient that approaches 1. This relationship would indicate that an increase in perceived data quality could result in a direct increase in system utilisation. A decrease in perceived data quality could there be expected to lead to low system usage (Haines & Petit, 1997).

Correlation analysis of regression model for system utilisation and perceived usefulness was expected to be positive but weak. The weaker relationship could be ascribed to factors such as voluntary and forced-utilisation (Seddon, 1997). The other compounding factor is the evaluation of usefulness by respondents at different levels of the organisation. Nevertheless, an increase in system utilisation was expected to positively influence perceived usefulness (Al-adaileh, 2009).

Analysis of multiple regression models between data quality, utilisation and usefulness was expected to be positive and strong. A correlation efficient that approaches 1 was therefore expected. The final regression model analysed evaluated service quality against user satisfaction. The relationship was expected to be positive and strong. All things being equal, improvements in HRIS service quality could result in overall satisfaction with the system (Ifinedo, 2006).

4.2.7 Primary and secondary data analysis

A distinction was made between data that was collected in on order to answer main research question and that which provide insights into the HRIS environment. Data collected for answering main research objectives is referred to as primary data. Furthermore, data collected in order to explore other observations is referred to as secondary data. This distinction was

made in order to aid analysis by isolating main study findings and identifying opportunities for further research (Sobh & Perry, 2005).

Primary and secondary data collected through quantitative and methods is analysed in the ensuing sections. Findings emanating from primary data are presented together with implications for management. Moreover, secondary findings are incorporated in order to present insights for management and academic researchers.

4.2.8 Primary quantitative data

4.2.8.1 Regression tables

4.2.8.2 Data quality (QUAL) and HRIS utilisation (UTIL)

In order to gather perceptions on data quality, an inverse approach was adopted in phrasing questions (Haines & Petit, 1997). The survey instrument is presented in appendices (7.2.1) of this document. Respondents were asked to rate *the lack of* a particular data quality dimension in their HRIS (Strong *et al*, 1997). For example, participants were asked to rate the presence of *incorrect* data in their HRIS. The options were; *high, medium, low* and *I don't know*. A respondent who selects *low* indicates that his/her HRIS data is of high quality. This is due to *low* presence of *incorrect* data. The users were also asked if they would continue using the HRIS if it was *optional* at their organisations. The sample population size (n) was 71.

Responses for the data quality dimension are listed in table alongside those of system utilisation. The regression table enabled statistical correlation analysis of a likely relationship between the two variables. Table 4-4 shows a linear relationship where an increase in one variable influences an increase in the dependent variable. The strength of the relationship was further measured using correlation analysis in the following sections. For example, if the quality of data in HRIS is improved, more users are likely to utilise the system. The opposite should also be true when data quality deteriorates.

Rate data quality in your HRIS?	Data quality (QUAL)	Would you use the HRIS if it was optional?	HRIS utilisation (UTIL)
<i>High</i>	40	<i>Yes</i>	93.5
<i>Low</i>	31	<i>I don't know</i>	1.7
<i>Medium</i>	19	<i>No</i>	5
<i>I don't know</i>	10		0

Table 4-4: Data quality and utilisation (source: author)

4.2.8.3 Utilisation (UTIL) and usefulness (USEF)

Participants were asked if they thought the HRIS was a useful business tool for their organisation. Response options were; *yes*, *no* and *I don't know*. Responses were listed alongside those of system utilisation for further statistical analysis. Table 4-5 shows values for system utilisation and usefulness. The data indicates a positive relationship between the two variables. Correlation analysis was applied in order to measure the strength of the relationship between the variables. The sample population size (n) was 71.

Would you use the HRIS if it was optional?	HRIS utilisation (UTIL)	Do you think the HRIS is a useful business tool?	HRIS usefulness (USEF)
<i>Yes</i>	93.5	<i>Yes</i>	89
<i>I don't know</i>	1.7	<i>I don't know</i>	1.8
<i>No</i>	5	<i>No</i>	8.9

Table 4-5: HRIS utilisation and usefulness (source: author)

In order to further explore perceived HRIS usefulness, respondents were asked if they thought their HR executive views the HRIS as an important business tool to achieve his/her objectives for the organisation. The study showed that 53.6% of respondents do not think that the HR executive views HRIS as an important business tool (refer to secondary quantitative data analysis).

4.2.8.4 Data quality (QUAL), utilisation (UTIL) and usefulness (USEF)

A multiple regression model was utilised to understand the influence of data quality and utilisation on usefulness (Wegner, 2007). Table 4-6 shows that a perceived improvement in data quality could be expected to raise the profile of the HRIS as a useful business tool. Similarly, improved utilisation of the HRIS coupled with a positive experience could lead to the HRIS being perceived as a useful business tool. This relationship is confirmed statistically in the correlation models of this chapter.

HRIS usefulness (USEF)	Data quality (QUAL)	HRIS utilization (UTIL)
89	40	93.5
1.8	31	1.7
8.9	19	5
0	10	0

Table 4-6: Multiple regression for usefulness, data quality and utilisation (source: author)

4.2.8.5 HRIS service quality (SERV) and satisfaction (SATI)

A regression table was compiled for the relation between SERV and SATI. In order to gather data on HRIS service satisfaction, participants were asked their *overall satisfaction with services provided by HRIS (IT) support team*. Response options were; *dissatisfied, very dissatisfied, satisfied, extremely satisfied, indifferent and not applicable – I'm from HRIS IT support*.

In order to gauge satisfaction with system, respondents were asked to *rate their overall satisfaction with the current HRIS*. Response options were; *dissatisfied, very dissatisfied, satisfied, extremely satisfied and indifferent*. Table 4-7 shows that when service quality increases, user satisfaction increases (Ifinedo & Nahar, 2006). We could therefore expect that improvement in the quality of HRIS related services by IT will have a positive impact on overall user satisfaction.

Rating scale	SERV	SATI
Very dissatisfied	0.00%	0.00%
Extremely Satisfied	1.70%	0.00%
NOT APPLICABLE - I am in HRIS (IT) Support	5.00%	0.00%
Indifferent	6.70%	11.80%
Dissatisfied	13.30%	7.80%
Satisfied	73.30%	80.40%

Table 4-7: Multiple regression for service quality and user satisfaction (source: author)

4.2.8.6 Correlation models

Responses to online questionnaire were downloaded to Microsoft Excel for statistical analysis. Pearson's correlation coefficient (r) was used to measure the strength of the relationship indicated by regression models in the previous section. Interpretation of the correlation coefficient is shown in figure 4-7. The total sample population size (n) for the study was 71.

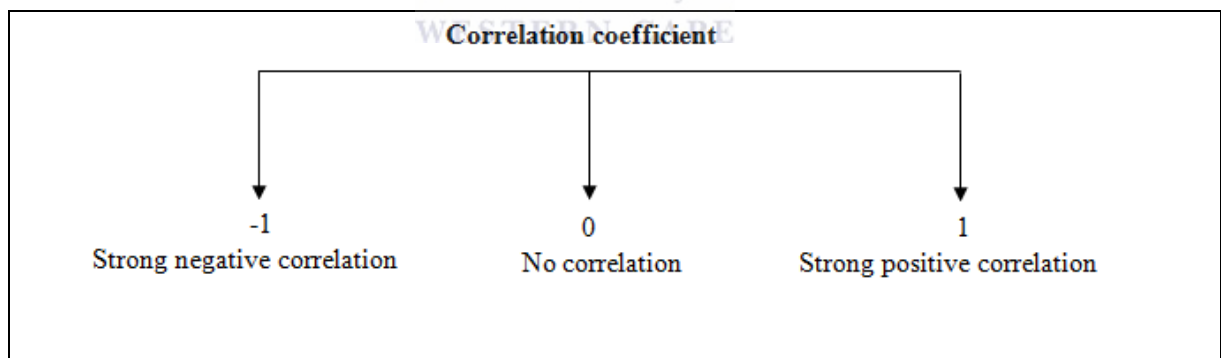


Figure 4-7: Interpretation of Correlation coefficient (Wegner, 2007)

4.2.8.7 Data quality (QUAL) and utilisation (UTIL)

The study sought to investigate the impact of perceived data quality (QUAL) on HRIS utilisation (UTIL) and perceived usefulness (USEF). Both quantitative and qualitative data analysis revealed that the concept of data quality is not holistically understood by HR personnel. This was evident in the high rating of the accuracy dimension (Wang & Strong, 1996).

This observation was further confirmed when users were asked to rank the importance of data quality attributes. Accuracy ranked amongst the most important, alongside security, validity and consistency (see secondary quantitative analysis). Therefore, it appears that the *intrinsic* data quality category is regarded as very important by HR users hence they ensure that it is met in their HRIS system.

Table 4-8 shows the summarised values for data quality and system utilisation as shown in table 4-8 in this chapter. The data was transferred to Microsoft Excel 2007 for statistical correlation analysis (Pearson’s correlation coefficient). The Pearson’s correlation coefficient (r) was 0.75. A coefficient (r) of this magnitude indicates a positive relationship between the two variables. This is shown by a super-imposed straight line in figure 4-8.

Response	Data quality (QUAL)	HRIS utilisation (UTIL)
High	40	93.5
Medium	31	1.7
Low	19	5
I don’t know	10	0

Table 4-8: Correlation values for data quality and system utilisation (source: author)

Figure 4-8 shows that when data quality increases, HRIS utilisation also increases. Consequently, it could be expected that a decrease in data quality would breed reluctance to use the system. However, in the context of the study, recognition must be given to the fact that other data quality dimension are lacking in the HRIS (see study findings). The strongest dimension was therefore *accuracy (intrinsic)*, which influences a positive linear relationship with system utilisation in figure 4-8. For example, if the *representational* dimension was to be mapped against system utilisation, the result would be a non-linear relationship.

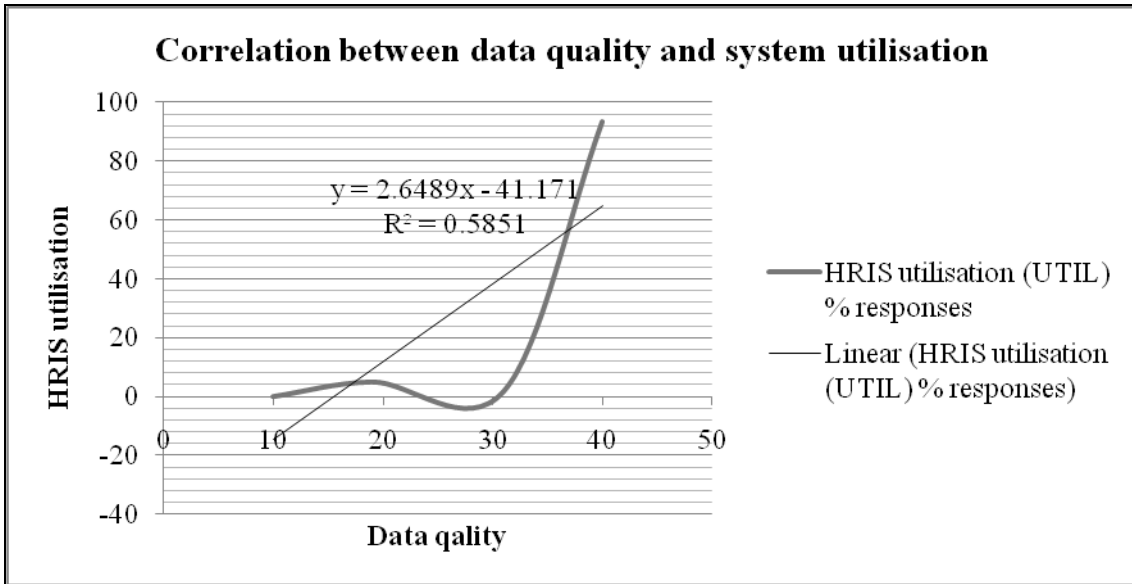


Figure 4-8: Correlation between data quality and system utilisation (source: author)

4.2.8.8 HRIS utilisation (UTIL) and HRIS usefulness (USEF)

Having established a positive correlation between perceived data quality and system utilisation, the relationship between the former and system usefulness was explored. The same procedure was performed in Microsoft Excel to produce table 4-9. The data was plotted in the scatter diagram chart in Excel, using layout 9. The result is shown in figure 4-9.

Response	HRIS utilisation (UTIL) % responses	HRIS usefulness (USEF) % responses
High	93.5	89
Medium	1.7	1.8
Low	5	8.9

Table 4-9: Correlation between system utilisation and usefulness (source: Author)

Figure 4-9 shows a linear relationship between system utilisation and perceived usefulness that is almost perfect. Pearson's correlation coefficient (r) was applied to the data in table 4-5 to measure the strength of the relationship. Pearson's correlation coefficient (r) of 0.998 was calculated.

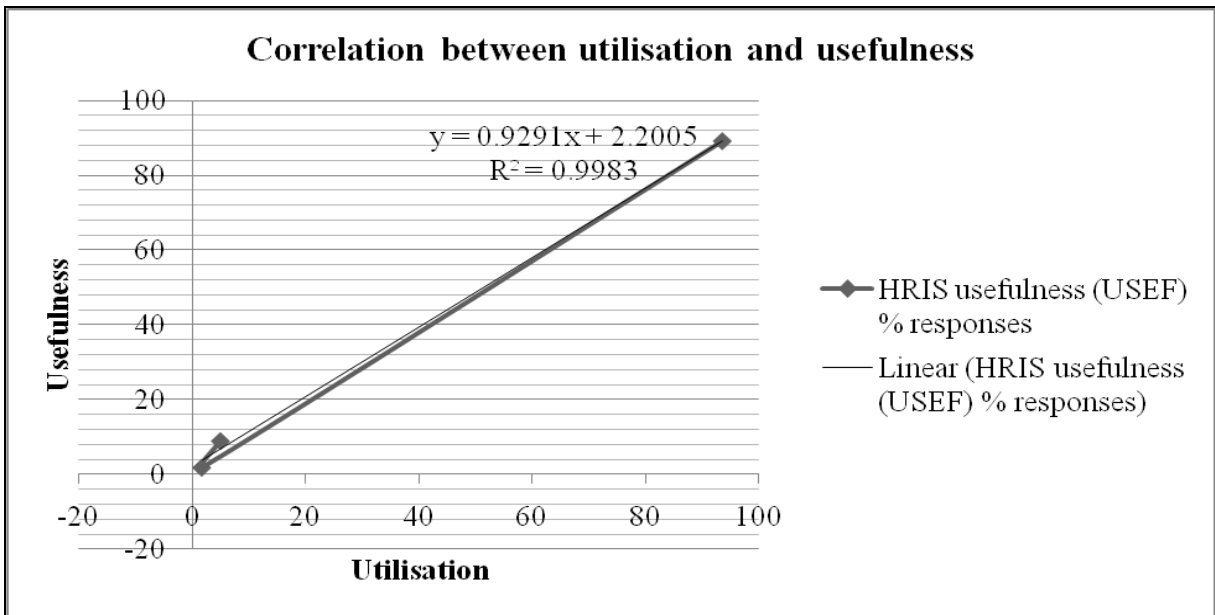


Figure 4-9: Correlation between system utilisation and usefulness (source: Author)

Pearson's correlation coefficient (r) of 0.998 indicates a strong positive relationship between the two variables. The coefficient implies that an increase in system utilisation is likely to lead to users perceiving the system as useful (Seddon, 1997). However, this could be affected by their experiences while utilising the HRIS. Experiences with the system have been found to influence user perceptions (Davis, 1989).

The researcher could assume that respondents had a positive experience in using the HRIS (Ifinedo, 2006). This assumption is supported by 76% of respondents who indicated that they were satisfied with their HRIS. Consequently, a negative experience in using the HRIS, indicated by dissatisfaction could be expected to result in the system being perceived as not adding value (Griffiths, Johnson & Hartley, 2007).

4.2.8.9 Data quality (QUAL), utilisation (UTIL) and usefulness (USEF)

A multivariate correlation analysis is often complex and confounded by various factors (Hyman, Lamb & Bulmer, 2006). Manual calculation of multivariate correlation was therefore avoided in this study (Wegner, 2007). However, regression table 4-6 was used to plot a scatter diagram and confirm the relationship between quality, utilisation and usefulness.

The variable of interest was usefulness (USEF) while the independent variables were data quality (QUAL) and utilisation (UTIL). Figure 4-10 shows a correlation model of all three variables. The model shows a linear relationship between the usefulness, data quality and system utilisation. It could therefore be expected that change in any of the independent variables (QUAL and UTIL) will influence usefulness (USEF) by the same magnitude.

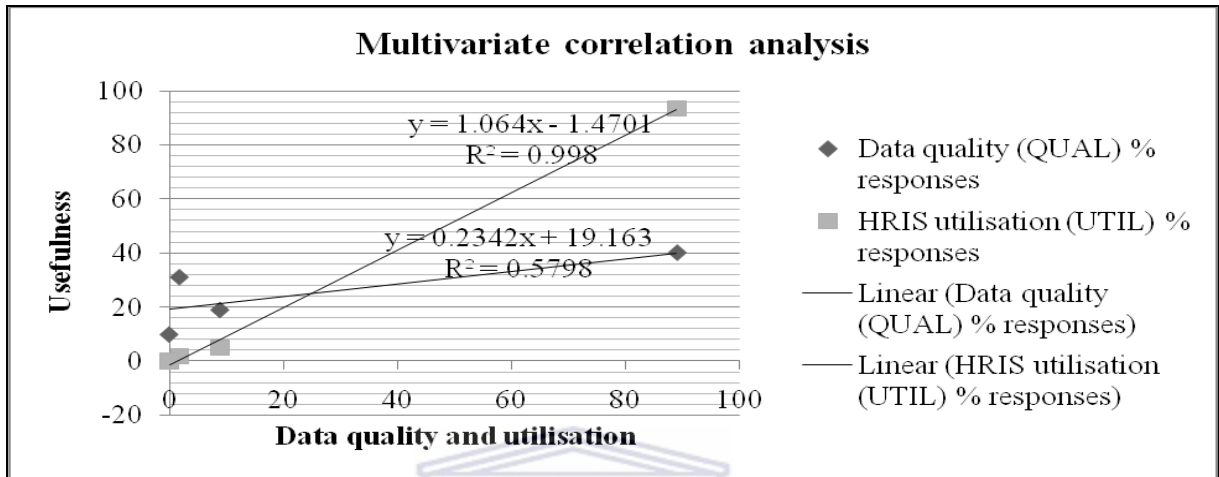


Figure 4-10: Multivariate correlation analysis for USEF, UTIL and QUAL (source: author)

4.2.8.10 HRIS service quality (SERV) and user satisfaction (SATI)

In order to perform correlation analysis, data from table 4-7 was used. The table (4-7) shows responses for SERV and SATI. The positive relationship is depicted by a linear relationship between HRIS service quality and user satisfaction (Figure 4-11). A coefficient of 1.0 was calculated, indicating a strong relationship, as per figure 4-11.

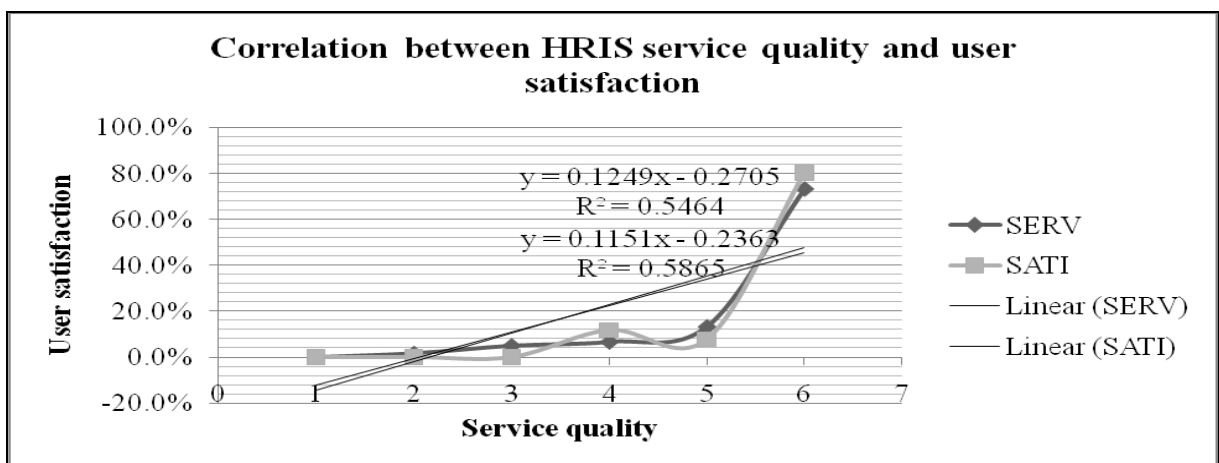
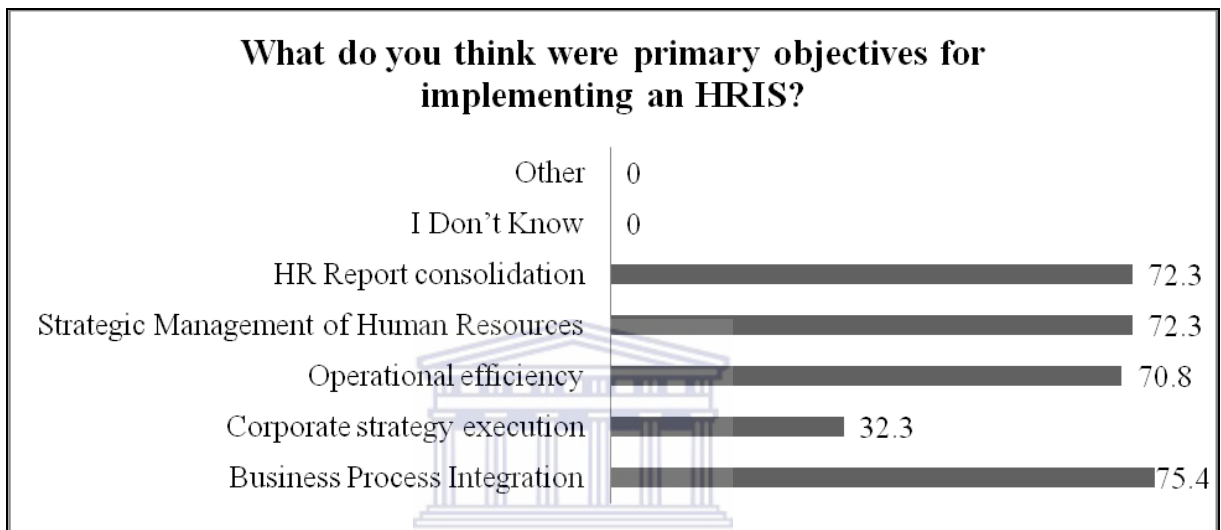


Figure 4-11: Correlation analysis for SERV and SATI (source: author)

4.2.9 Secondary Quantitative data

4.2.9.1 Objectives for HRIS implementation

Respondents were asked to identify possible reasons for the HRIS implementation at their organisations. Figure 4-12 indicates that most organisations would implement an HRIS in order to integrate business processes (75.4%). Moreover, report consolidation (72.3%), strategic HRM (72.3%) and operational efficiency (70.8) were other key reasons for HRIS implementation.



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Figure 4-12: Primary objectives for HRIS implementation (source: author)

4.2.9.2 HRIS alignment with HR and organisational goals

Participants were asked if the HRIS met the goals of the HR department. Response options were *Yes*, *No* and *I don't know*. The majority of respondents answered, *Yes* (86.2%). Other participants (10.8%) did not know if the system does meet their departmental objectives (see figure 4-13).

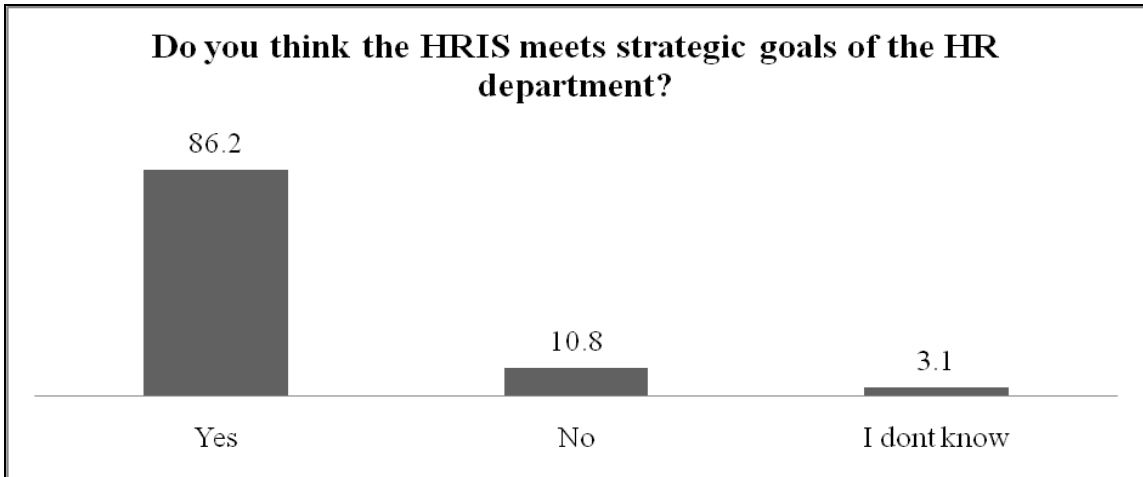


Figure 4-13: HRIS alignment to HR departmental goals (source: author)

A follow-up question was asked to understand participant perceptions of HRIS alignment to organisational goals. The question asked if they thought the HRIS met strategic goals of the organisation. There was indifference at this level with 49.2 % answering *NO* while 41.5% answered *Yes*. The other 9.2 % did not think that the HRIS does meet organisational goals (see figure 4-14 below).

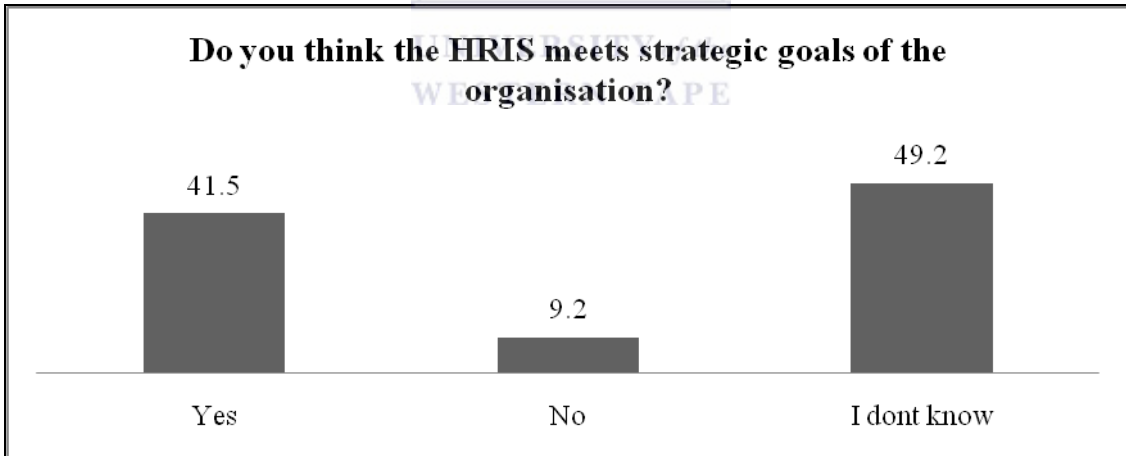


Figure 4-14: HRIS alignment to organisational goals (source: author)

4.2.9.3 HRIS utilisation by task type

Analysis of the HRIS utilisation revealed that it was used mostly for operational tasks as shown in figure 4-15. This could be attributed to the fact that 50% of respondents indicated that their role was operationally focused. However, there is recognition of the strategic value

of the system, indicated by 39.3% of respondents citing that they use the system for both operational and strategic tasks (Boateng, 2007).

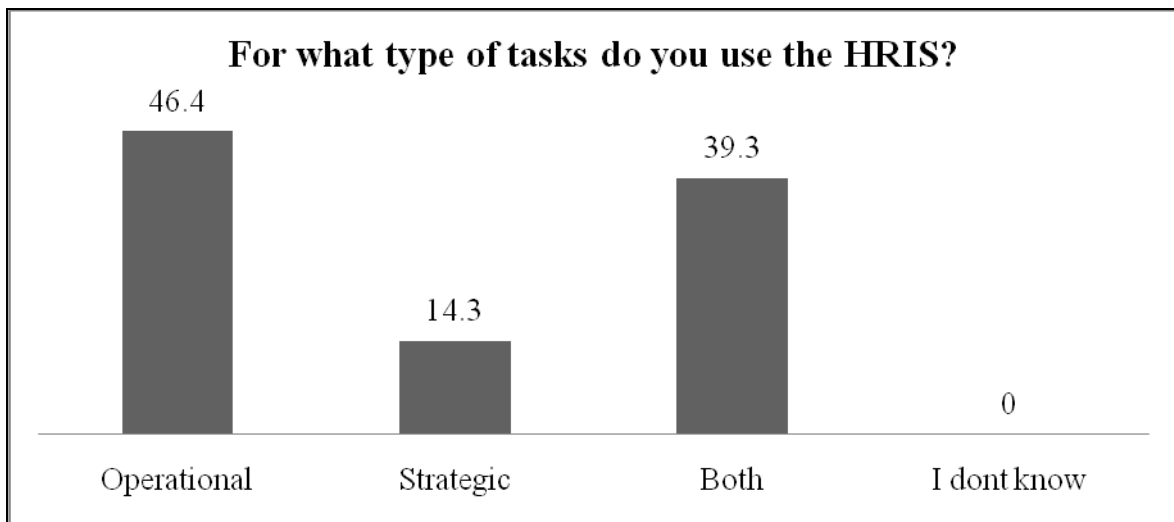


Figure 4-15: HRIS utilisation by task type (source: author)

4.2.9.4 Importance attached to data quality attributes

Respondents were asked to rate the importance they assign to each data quality attributes. The options for each attribute were *Very Important*, *Important*, *Not important* and *I don't know*. Survey data showed that user assign a significant level of importance to accuracy (96%), validity (93%) and security (90%) among other quality attributes. Figure 4-16 shows responses per quality attribute. None of the participants selected *Not important* and *I don't know* respectively. This observation indicates that all data quality attributes are important to the consumers.

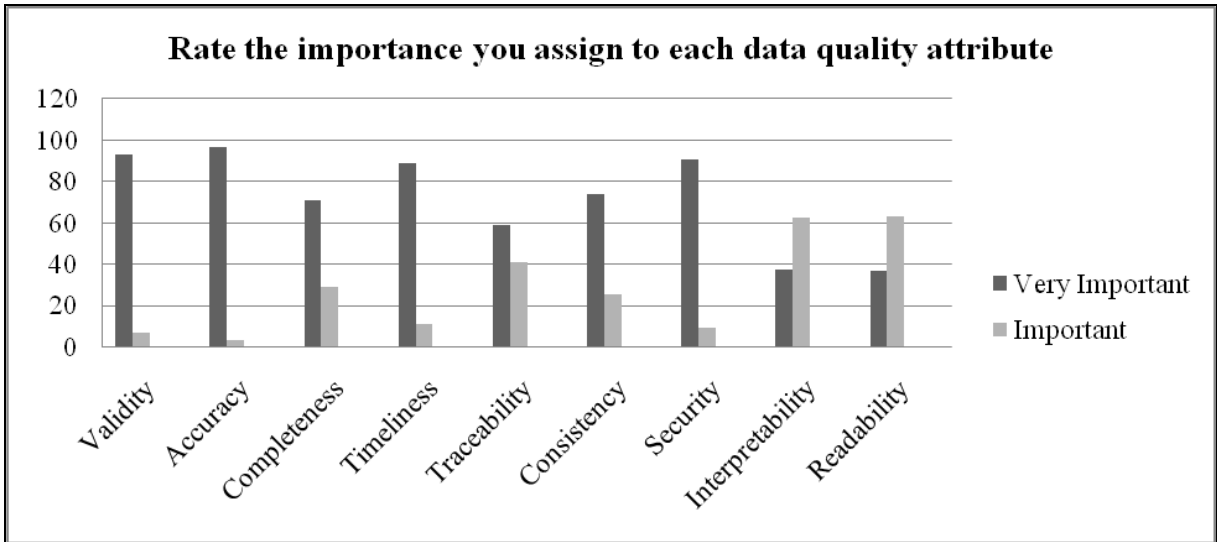


Figure 4-16: Rating of data quality attributes by importance (Source: author)

4.2.9.5 Possible causes of poor data quality

When asked about possible causes of poor data quality, respondents identified poor data capturing skills (88.3%), lack of data quality awareness (65%), Lack of regular data updates (48%) and poor system validation (40%). Figure 4-17 shows that the majority of respondents believe that data quality problems emanate from both technical and non-technical factors. It must be noted that the high percentage of these factors are non-technical, 88.3% and 65% respectively. Therefore, an initiative that seeks to improve HRIS data quality should address both system and non-technical factors in order to effective.

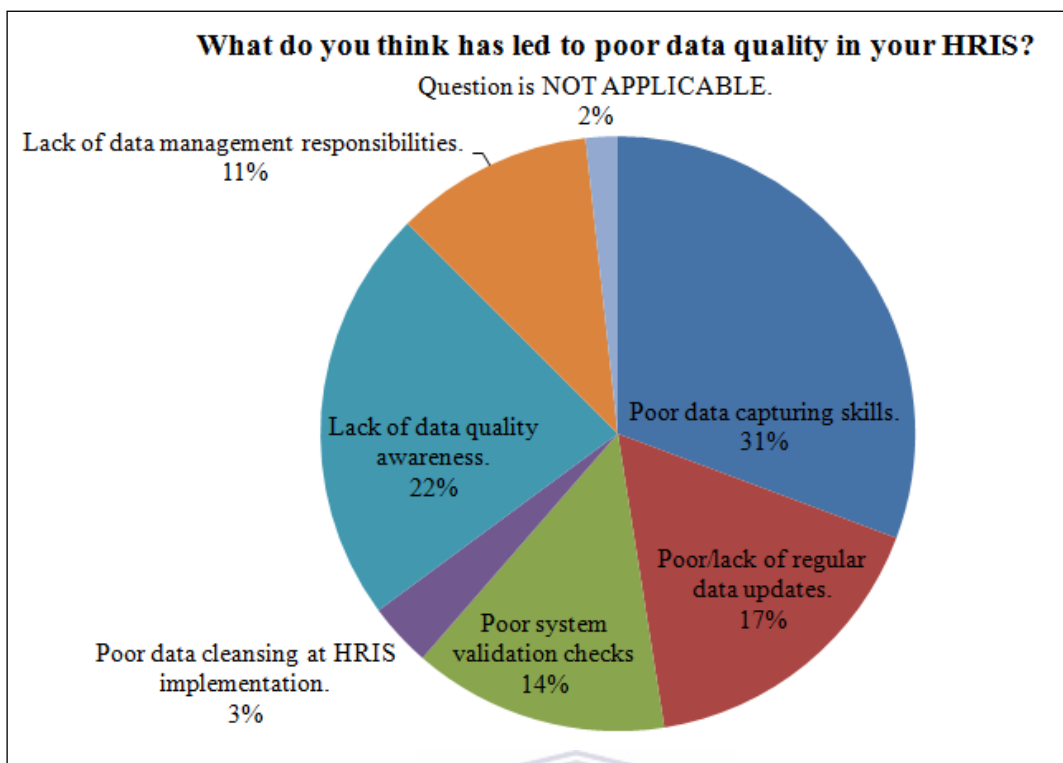


Figure 4-17: Possible causes of poor data quality (Source: author)

4.2.9.6 Possible remedy for poor data quality

A follow-up question on causes of poor data quality in HRIS was asked. Respondents were asked to identify possible remedies to HRIS data quality problems. Participants were given three options per possible data quality improvement initiative. The options were, Never, Maybe and Definitely. The results of the survey are presented in figure 4-18. The data shows that respondents believe that data quality (91%) and system training (87.8%) for capturers is critical. Equally important are in-built system validation checks (89.4%) and an organisation-wide data quality management program (85%).

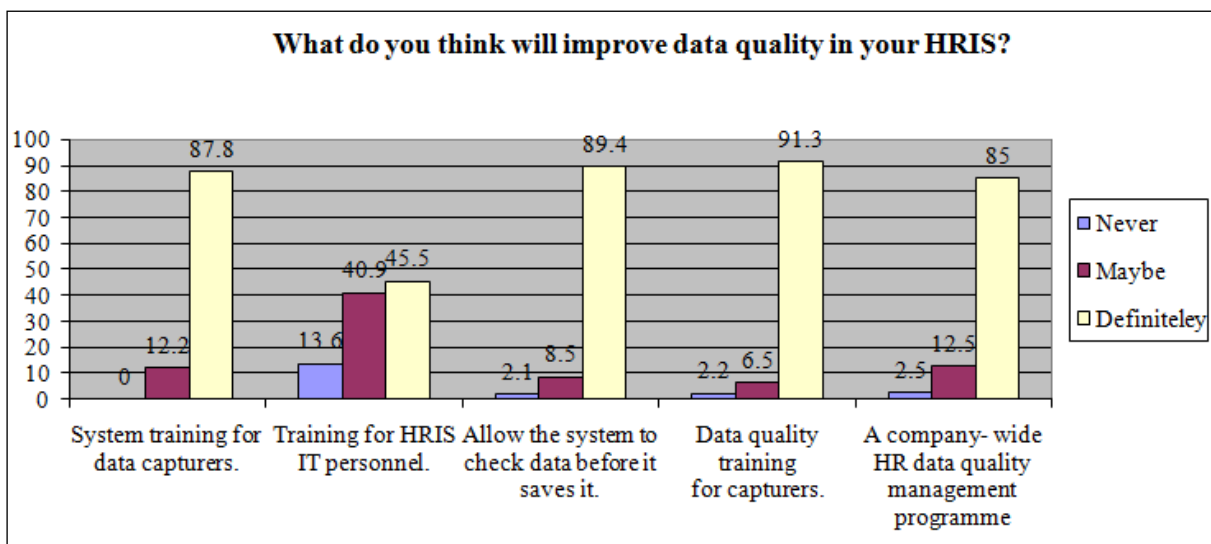


Figure 4-18: Possible remedy for poor data quality (Source: author)

4.2.9.7 Perceptions of HR executive attitude towards HRIS

Respondents to the online questionnaire were asked whether they thought their HR executive recognises the HRIS as an important business in achieving his/her objectives. The responses were *Yes*, *NO* and *I don't know*. More than half (53.6%) participants did not think that their HR executive recognised the system as an important business tool. Figure 4-19 shows that only 25% of respondents were confident that their executive recognised the importance of the HRIS.

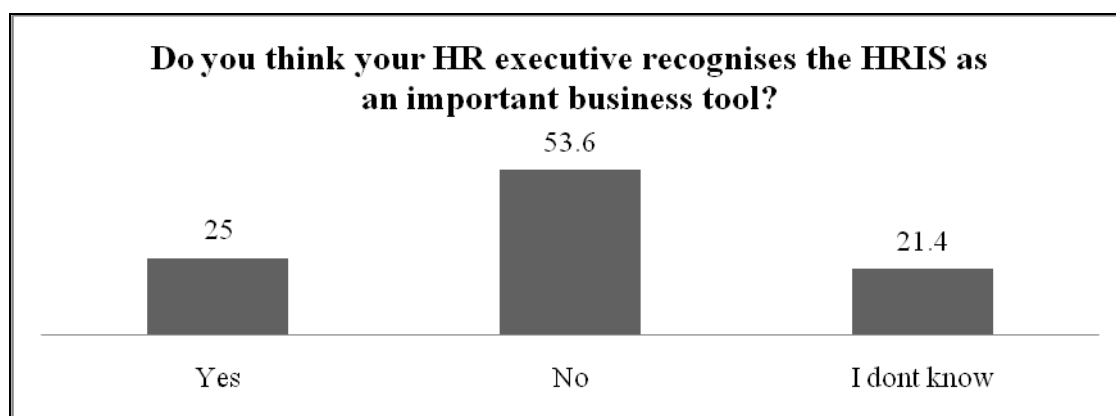


Figure 4-19: Perceptions of HR executive attitude towards HRIS (source: author)

4.2.9.8 HRIS impact

The questionnaire probed perceptions of the impact of HRIS at individual, departmental and organisational level. Participants were asked if the HRIS improved the way they performed

their tasks. There was consensus among respondents with 92.9% indicating that the HRIS has improved the way they worked (see figure 4-20 below).

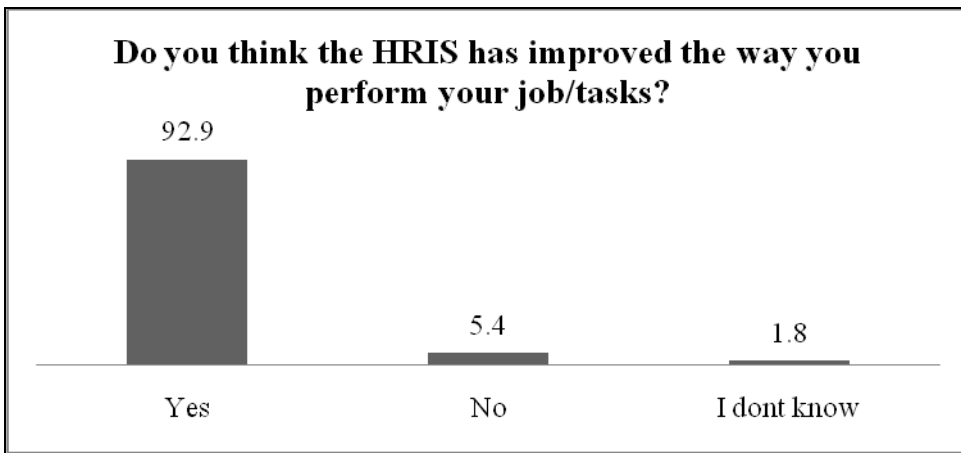


Figure 4-20: Individual impact of HRIS (source: author)

More than half (78.6%) of respondents felt that the system has improved the way their department worked. The other 10.7% felt that the HRIS has not had any impact on their department. Furth10.7 % did not know if the system has improved the way the HR function worked (see figure 4-21 below).

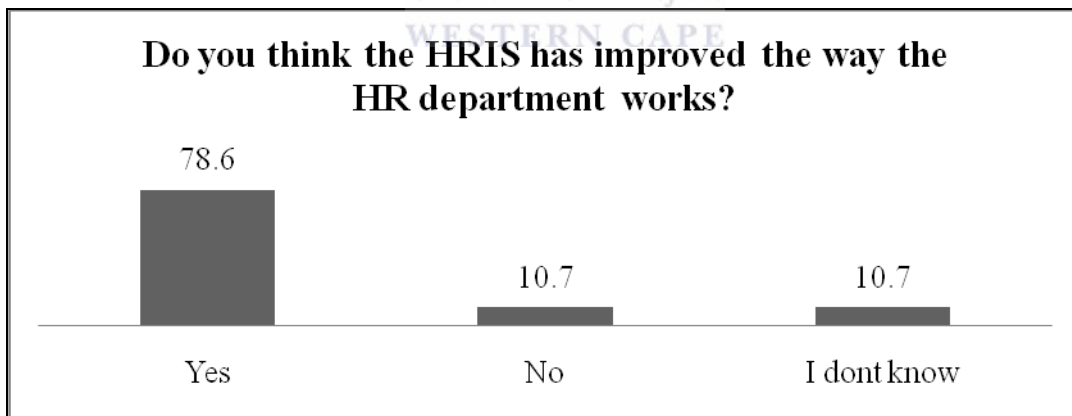


Figure 4-21: Departmental impact of HRIS (source: author)

Half (50%) of participants indicated that the system has improved the way their organisation worked. The other half felt that they could not tell if their organisation worked better because of the HRIS. The other 7.1% felt that the system did not improve the way their organisation worked (see figure 4-22 below).

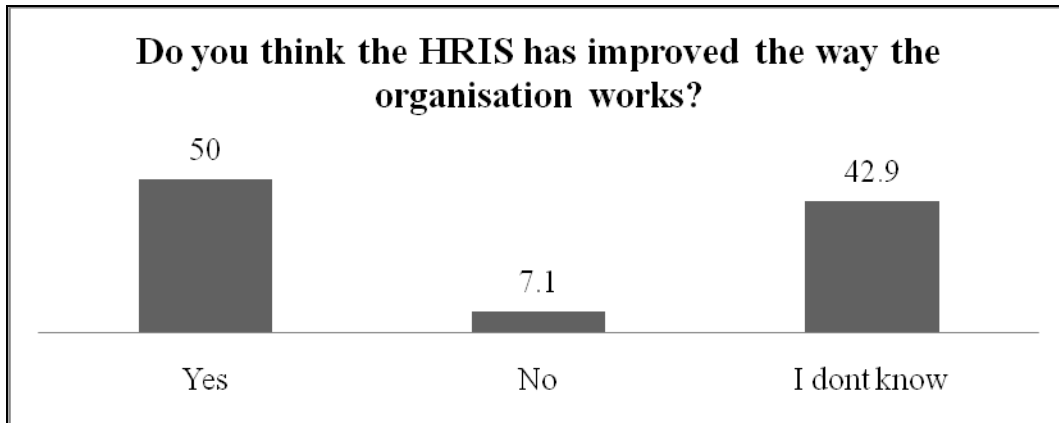


Figure 4-22: Organisational impact of HRIS (source: author)

4.2.9.9 Accountability for HRIS

More than half (61.7%) participants in the online survey indicated that they did not have an HRIS manager. In these organisations, the HRIS appears to be the responsibility of the IT Manager. There was however 32.7 % who indicated that they did have a manager responsible for the HRIS. Figure 4-23 shows result of the survey.

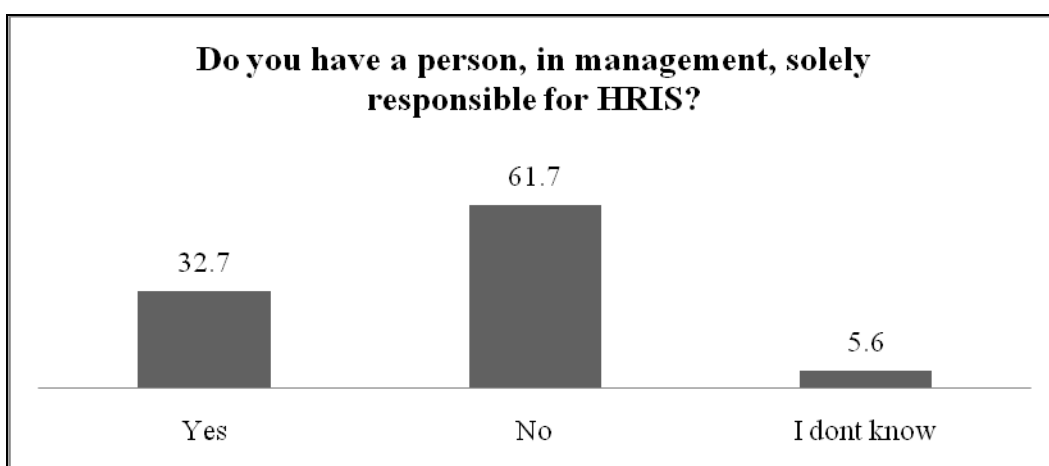


Figure 4-23: HRIS accountability (source: author)

4.2.10 Qualitative data analysis

Qualitative data was analysed using content analysis, according to pre-defined interview guide themes (Sobh & Perry, 2005). Interview guide is attached to this document under appendices (7.2.2). Actual numbers of respondents were used instead of percentages applied in quantitative data analysis. This is due to the low number of respondents interviewed.

Content analysis was chosen for its strength in allowing the researcher to conduct analysis while data is being collected (Johnson & Onwuegbuzie, 2004). This movement between data collection and analysis improved the quality of responses as the interview guide was adjusted continuously during data collection (Williams, 2007).

Moreover, the deductive approach was supplemented by an induction analysis of further themes emerging from the data (Fereday & Muir-Cochrane, 2006). This decision ensured comprehensive understanding of data quality impact on utilisation and usefulness. For example, an analysis of responses to data quality revealed that users put more emphasis and effort on accuracy since most of them are measured on this dimension (Friedman, 2006).

4.2.10.1 Data quality understanding

In the absence of guidelines on what *data quality* is, respondents gave diverse answers. The most prevalent data quality attribute mentioned was *accuracy*. This observation was indicated by phrases such as, but not limited to; few errors, always correct, reports reconcile, data reflecting reality. Table 4-10 summarizes phrases that emanated from interview transcripts.

Theme	Question	Responses (count)
Data quality	What is your understanding of data quality?	<i>My reports are always correct (7), no errors in the data (2), employee records are up to date (4), reports reflect reality (1), all reports reconcile (5), data is always correct (2)</i>

Table 4-10: HR management's understanding of data quality (source: author)

Table 4-10 shows that the understanding of data quality by HR personnel is primarily related to *accuracy*. This was shown by the recurrence of the words; *correct*, *accurate* in more than 50% of qualitative interviews. HR personnel appear to value the intrinsic data quality dimension over the others. This implies that data quality as a discipline has not been adequately embraced by HR. A study conducted by Wang and Strong (1996) revealed similar findings.

4.2.10.2 State of data quality in HRIS

HR managers were asked their opinions about the state of data quality in their HRIS. Analysis of responses to this question revealed that managers don't consider their data to be of poor quality. The use of words such as good, fewer errors, correct indicated that the intrinsic data quality dimension was met at most of these organisation's HRIS (Eckerson, 2002). Table 4-11 shows responses to this state of HRIS data quality questions. Five respondents thought their HRIS data quality was ok, meaning they were reasonably happy with it. Therefore, managers don't perceive their HRIS data to be of poor quality.

Theme	Question	Responses (count)
Data quality	What do you think of the quality of data in your HRIS? Why?	<i>Good (3), it could be better (2), it's ok (5), it's usually correct (1), great (1), it's correct, sometimes (2); we always check it before submitting to exco (8), there are few errors (3).</i>

Table 4-11: State of data quality as perceived by HR managers (source: author)

4.2.10.3 Important data quality attributes

Respondents were asked to name they deem to be the most important attribute of quality data. The majority of respondents selected *accuracy*. Figure 4-24 shows the number of interviewed managers and the data attribute they selected. Data reflects that accuracy and completeness are the most important data quality attributes for HR managers (Strong *et al*, 1997). Security was also identified as a key attribute of quality data (Helfert *et al*, 2002). This could be attributed to the emphasis that organisations put on these data quality dimensions (Friedman, 2006).

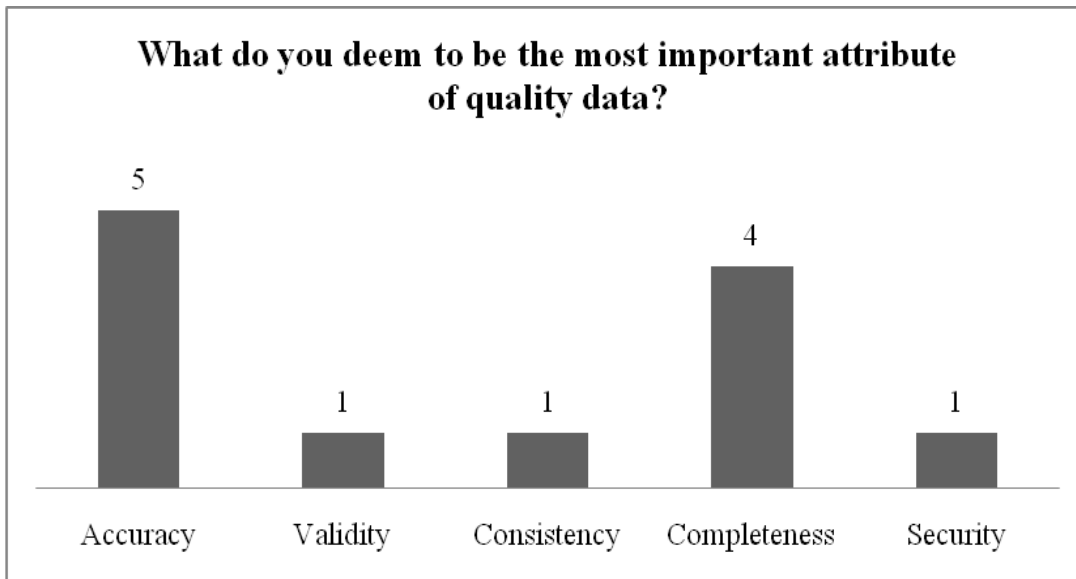
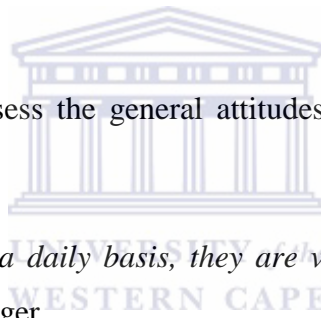


Figure 4-24: Important data quality attributes for HR Managers (source: author)

4.2.10.4 HRIS utilisation

Participants were asked to assess the general attitudes towards the HRIS. Responses were mostly positive.



*...My team uses the HRIS on a daily basis, they are very keen on doing everything on the system.....*narrated an HR manager.

Follow-up questions on the reasons why users were keen on using the system were met with various responses;

*...We have been able to extract our reports a lot quicker than in the previous system. There are few errors in the employee records than it used to be. We are able meet our deadlines for month-end....*cited an HR manager of a retail organisation.

Respondents were further asked if the HRIS was optimally utilised at their organisation. A follow-up question was asked, to understand the rationale behind each answer. The responses were analysed in terms of those who answered yes and those who responded with a no. Analysis revealed that some managers the system was underutilised (Gable, Sedera, & Chan, 2003). Other respondents indicated that the HRIS was optimally used (Hong, Kim & Heeseok Lee, 2008).

Four (4) respondents thought that their HRIS was being optimally utilised (Table 4-12). This view was supported by the fact that their processes were streamlined (Kovach & Cathcart, 1999). Vendors have also recommended implementation of certain functionalities which these organisations have embraced. Their data is more accessible than before the HRIS (Jayasundara, 2003).

Theme	Question	Responses (count)	Rationale
HRIS utilisation	Do you think the HRIS is optimally utilised in your organisation? Why?	Yes (8)	<i>Less paperwork, records are accurate, statutory reports are easy to compile, processes are streamlined, data is accessible, we use most of the functionality.</i>
		No (4)	<i>resistance to change, don't know what else the system can offer, only use what we need, only use the basics, we don't want to complicate our processes</i>



Table 4-12: HRIS utilisation as perceived by HR managers (source: author)

Eight (8) HR managers perceived their HRIS as being underutilised (Ifinedo & Nahar, 2006). Amongst the reasons for the underutilisation, they mentioned resistance to change. They also mentioned that they were not aware of other functionality of the HRIS apart from what they were currently utilising (Kovach *et al*, 2002). There was also reluctance to modify business processes as a result of attempts to optimally utilise the HRIS (Laukkanen, Sarpola & Hallikainen, 2007).

In order to analyse another dimension of HRSI utilisation, HR Managers were asked the type of tasks they thought the HRIS was being used for. Figure 4-25 shows the responses to this question. Half of the respondents perceived their HRIS as serving operational purposes for their organisations (Kovach *et al*, 2002).

There is consistency between quantitative and qualitative data on the operational utilisation of the HRIS (Figure 4-15 and 4-25). However, utilisation of the HRIS for both operational and strategic tasks was lower in the qualitative interview responses (Lawler & Mohrman, 2003). The data appears to suggest that the HRIS, as perceived by management, is not primarily a strategic asset of the organisation (Boateng, 2007).

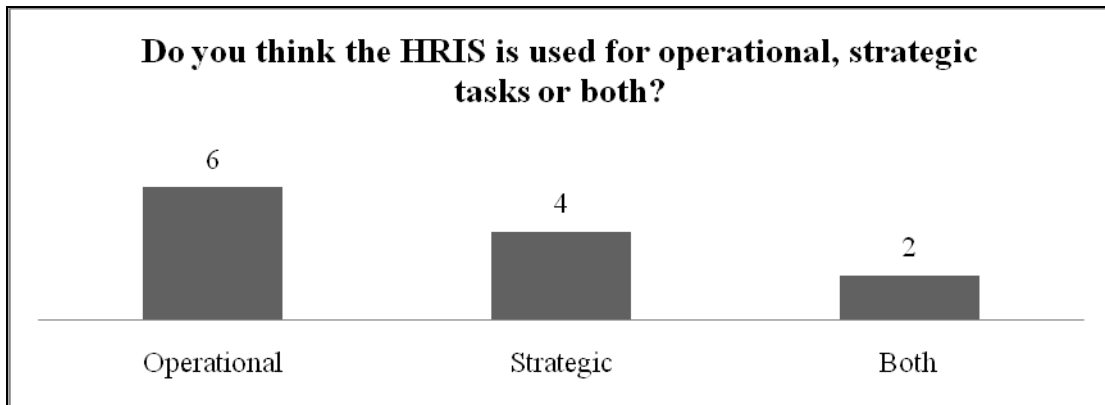


Figure 4-25: Qualitative HRIS utilisation by task type (source: author)

4.2.10.5 HRIS usefulness

Participants were asked if they perceived the HRIS as a useful business tool. The majority of respondents (8) agreed that the HRIS is a useful business tool. When asked to justify their answers, various responses emerged (table 4-12). Among the reasons for HRIS being considered useful were; process automation, reporting, security and others. Managers (4) who did not consider their HRIS as useful cited, among other things; system being cumbersome, lacking certain functionality and flexibility (Voerman & van Veldhoven, 2007).

*Since implementation, the system has been cumbersome and I still don't have my reports the way I want them...*accounted one of the managers during the interview.

*.....It takes us about two days to prepare our Workplace Skills plan and other statutory reports...*attested an HR executive. These responses highlighted a key area of the HRIS that seems to fall short of user expectations, that is reporting.

The data in table 4-13 coincides with responses to the online questionnaire. Majority of respondents (89%) to the online questionnaire considered the HRIS as a useful business tool.

However, the majority of these respondents were not aware of the ways in which HRIS has improved the organizations' effectiveness (Ngai & Wat, 2004).

There could be numerous factors affecting this perception about HRIS effectiveness at organisational level (Ramlall, 2003). Among those factors could be executive interest and communication of HRIS benefits at organisational level. Moreover, a clear link between organisational goals and the HRIS could also enlighten employees about HRIS benefits.

Theme	Question	Responses (count)	Rationale
HRIS usefulness	Do you think the HRIS is a useful business tool for the organisation? Why?	Yes (8)	<i>Minimised paperwork, training records are accurate, statutory reports are easy to compile, processes are more streamlined, data is accessible, most processes are automated, we can track every transaction, managers are more accountable for their data, confidentiality</i>
		No (4)	<i>It is cumbersome, we cannot easily report on our headcount, it slows down productivity, it does not meet our timesheet requirements</i>

Table 4-13: HRIS usefulness as perceived by HR managers (source: author)

The data in table 4-13 contradicts that of table 4-7. In table 4-8 of quantitative data analysis, respondents indicated that their HR executive did not view the HRIS as a useful business tool or they did not know his/her opinion on the HRIS. Data seems to suggest a communication gap on HRIS matters between the HR executive and the rest of the HR department. This could also indicate that HR personnel at lower levels of the organisation do not understand the link between HR business strategy and the HRIS.

4.2.10.6 HR Data quality initiatives

Respondents were asked if their organisations had undertaken any data quality initiative in the recent past. More than half (7) of the organisations had initiated an HR data clean-up project. All of these initiatives were aimed at ensuring that employee records were up to date in terms of qualifications, beneficiary nomination, benefit entitlement, to name a few. A further analysis of the scope of these initiative revealed that they did not focus on other data quality attributes. This observation is consistent with Helfert, Zellner and Sousa (2002). Helfert, Zellner and Sousa found that general data quality initiatives were not prevalent in organisations.

4.3 Findings

The objective of the study was to investigate the impact of perceived data quality on system utilisation and perceived usefulness at large South African organisations. This chapter has outlined the analysis of data collected for the purposes of achieving the stated study objective. This section presents findings emanating from data analysis. The researcher did not make a distinction from findings emanating from primary and/or secondary data analysis. This decision was made in order to present a concise view of the phenomenon (Basit, 2003).

4.3.1 Role of the HRIS in organisations

Finding 1: *The HRIS primarily serves as an operational tool in organisations.*

This study found that the HRIS is primarily utilised for operational tasks. The online survey showed that 46% respondents used the system to execute operational tasks (Figure 4-15). Half of the participants interviewed also indicated that they used the HRIS for operational tasks (Figure 4-25). There is a level of strategic utilisation of the system, although it is minimal (Morley *et al*, 2006).

This seems to confirm the traditional view of the HR department as a predominantly administrative function (Lawler & Mohrman, 2003). The HRIS therefore seems to inherit the reputation of the HR function (Hoover, 2002). There is recognition of the strategic role of the HR department. However, such recognition is not yet at the level that it is often expected, as a strategic business partner (Boateng, 2007; Morley *et al*, 2006).

Strategic utilisation of the HRIS would include capabilities such as talent sourcing, development and deployment, among others (Jayasundara, 2003). Such functionalities would also integrate with service provider and partner systems outside the organisation (Aberdeen Group, 2007). These system capabilities were not present in the participant organisations (Fletcher, 2005).

4.3.2 Important data quality dimensions

Finding 2: HR personnel views intrinsic data quality dimension as very important

In figure 4-16, more than 90% respondents rated accuracy and validity as very important data quality attributes (Redman, 2005). The category was followed by contextual and accessibility (figure 4-16 and 4-24). The finding suggests that HR personnel might not put as much emphasis on other data qualities such as interpretability and consistency, to name a few (Friedman, 2006).

Lack of awareness appears to result in other data quality attributes being ignored (Wang & Strong, 1996). It seems that HR has not adequately progressed in terms of understanding the holistic concept of quality data (Wang, 1998). For example, accurate data that cannot be easily interpreted could result in loss of competitive advantage.

4.3.3 The state of HRIS data in South Africa

Finding 3: HRIS data is generally not of poor quality

The study found that HRIS data in general, is not perceived to be of poor quality. Detailed and summary responses are shown in Table 4-1 and 4-4 respectively. Participants rated their HRIS data quality as high (40%) and medium (19%). Moreover, qualitative interviews also revealed that users do not perceive their HRIS data to be of poor quality. However, there are certain data quality attributes that are lacking, such as ease of access (70%), timeliness (78%) and completeness (73%) shown in table 4-1.

Although the data reflects high percentages for quality attributes that are lacking in HRIS, users do not perceive their data to be poor. This could be due to emphasis put validity and accuracy as reflected in figure 4-16 (Olson, 2003). Therefore, although these quality attributes

are lacking, they are not likely to influence user attitudes towards the HRIS. It should therefore be expected that their utilisation of the system will remain unaffected.

4.3.4 HRIS data quality and utilisation

Finding 4: A positive relationship exists between perceived data quality and system utilisation

A positive relationship was found between HRIS data quality and system utilisation. This relationship was shown by correlation coefficient of 0.75 (figure 4-8). In the context of the findings, data quality predominantly represented the intrinsic category (Wang *et al*, 2007). Qualitative interviews found that when HRIS data is perceived to be of high quality, voluntary utilisation of the system also improved.

Other factors that could affect HRIS utilisation were not studied, except for HRIS service quality (Ifinedo, 2006). Service quality was found to be positively related to system utilisation. An assumption was also made that positive experiences with the HRIS contributed to increased utilisation (Seddon, 1997).

It could therefore be expected that implementation of data quality initiatives in HR could result in quality information and improved system utilisation (Eckerson, 2002). Increase system utilisation could in turn result in the HRIS benefits being realised. A deterioration of HRIS data quality should be expected to result in less utilisation of the system, thus impeding realisation of system benefits (Willcocks & Lester, 1993).

4.3.5 HRIS utilisation and usefulness

Finding 5: A positive relationship exists between system utilisation and perceived usefulness.

Correlation coefficient of 0.9 was calculated between utilisation and usefulness, thus indicating a strong positive relationship. Increased system utilisation, coupled with positive HRIS experiences (HRIS service) was found to positively influence perceived usefulness (Figure 4-9). The majority of respondents to online questionnaire as well as interviews perceived their HRIS as useful. HRIS users who did not perceive their HRIS as a useful business tool were not likely to utilise it (Sabherwal, Jeyaraj & Chowa, 2006).

Therefore, it could be expected that increased utilisation of the system could result in further enhancements thus improving system benefit (Wu & Wang 2006). For example, users might realise that certain functions could be used in a better way than originally anticipated. This realisation might result in the system being enhanced to improve individual and organisation efficiency (Kemarati, 2007).

4.3.6 Data quality, HRIS utilisation and usefulness

Finding 6: A positive relationship exists between perceived data quality, system utilisation and usefulness.

The study found a positive relationship between data quality, system utilisation and usefulness (figure 4-10). Production of quality HRIS data, which meets user needs, could result in increased HRIS utilisation. Increased utilisation of the system could result in enhancements and more value (usefulness) to the organisation. A system that adds value to the individual employees, functional departments and organisation at large could be considered as useful (Davis, 1989).

A focused effort in improving HRIS data quality could result in significant value for the organisation (Otto *et al*, 2007). For example, a focused effort to address the representational data quality dimension could implement a business intelligent tool. The tool could expose or validate the intrinsic and contextual data qualities. The tool can be used to provide different views of the HRIS data for strategic decision making (Chaffey & Wood, 2005).

4.3.7 HRIS service quality and user satisfaction

Finding 7: A positive relationship exists between HRIS service quality and user satisfaction.

A very strong relationship was found between HRIS service and over satisfaction as indicated by coefficient of 1.0 (figure 4-11). The study therefore found that users who expressed satisfaction with HRIS services also indicated that they were satisfied with the system (Seddon, 1997). It could therefore be expected that users that are not happy with HRIS services will also not be satisfied with the system (Bokhara, 2005).

Therefore, in order to ensure HRIS success, ERP vendors and internal IT organisation should provide superior customer service (Ifinedo, 2006). These could include system training, coaching, technical support, among other things (Ifinedo, 2007).

4.3.8 Accountability for HRIS

Finding 8: Most organisations do not seem to have a dedicated manager for HRIS

The study found that most organisations do not have a dedicated HRIS manager. This was indicated by 61.7% respondents saying they do not have such a role. Qualitative interviews also revealed that most organisations do not have an HRIS manager role. HRIS responsibilities were held by the IT manager (Bussler & Davis, 2002). It should therefore be expected that a dedicated HRIS manager could improve the services provided to business (Ifinedo, 2006). The HRIS manager could be expected to align the system with SHRM objectives on a continuous basis.

4.3.9 HRIS impact

Finding 9: The HRIS has a positive impact on the individual and organisational performance

The study revealed that the HRIS has a positive impact on individual performance. Respondents (92.9) indicated that the HRIS has improved the way they work (figure 4-20). This is consistent with DeLone and McLean model of 2003, which suggests that information systems have an impact on individual performance. A quality information system has been found to have a positive impact on user performance (Almutairi & Subramanian, 2005).

The HRIS is perceived to have a positive impact on the HR function as a whole. Users (78.6) indicated that the HRIS has improved the way their department worked (figure 4-21). The findings of Ngai and Wat (2004) also indicated that the HRIS could facilitate organisational performance. However, this study found that organisation performance beyond the HR function was uncertain. Half (50%) of the participants indicated that the system has improved organisational performance. The other 42.7% indicated that they did not know if the HRIS has improved organisational performance (figure 4-22). This is not surprising since organisational performance is difficult to measure due to many variables that could influence it.

4.3.10 Executive attitudes towards HRIS

Finding 10: *HR executives do not seem to recognise the HRIS as a useful business tool.*

HR personnel (53%) do not think their HR executives recognise the HRIS as a strategic business tool. Figure 4-19 showed that executives are perceived to be treating the HRIS as an administrative tool (Kovac & Cathcart, 2002). This attitude towards HRIS could hamper its capability of transforming the HR function to a strategic business partner (Lawler, 2005). The HR function could therefore suffer the lost opportunity of influencing organisation performance (Ruel *et al*, 2007).

The HRIS could enable efficient execution of HRM strategic objectives (Jayasundara, 2003). Therefore, the profile of the HRIS should be raised at organisations so as to provide necessary resource to achieve SHRM objectives. The ability of the HRIS to streamline processes and consolidate data sources is critical in supporting the business strategy (Tyson, 2007).

4.4 Implications for management

Study findings present insights, challenges as well as opportunities for organisations. This section discusses such implications with a view that management will take note, evaluate their organisational circumstances and take appropriate action. Organisational circumstances are diverse hence it is up to management to make decisions as to what is applicable to their organisations.

4.4.1 The role of HRIS

The study found that the HRIS is primarily utilised for operational tasks. As an enabler of SHRM, the system should strike the balance between operational and strategic tasks. The goal of SHRM is achieve strategic goals of the organisations, through people. In order to achieve this goal, the HRIS has to play a strategic role. The profile of the HR department as a strategic partner does not seem to have materialised. Despite recent models in integrating the HR function as a key role player in strategy execution, it is still viewed as operational (Maxwell & Farquharson, 2008). Therefore, management has to play a key role in changing this perception about HR and their technologies (Ruel *et al*, 2007).

4.4.2 Executive interest in HRIS

Management should show active interest in HRIS matters in order to raise the profile of these strategic systems. The study found that personnel involved with the HRIS think their HR Executives are not concerned about the system. Other respondents were uncertain about their HR executive's viewpoint on the HRIS (Kim, Lee, & Gosain, 2005). Study findings suggest that there could be a real or perceived lack of interest in HRIS from executives (Buyens & De Vos, 2001). These perceptions could breed resistance to HRIS due to lack of active interest from HR management. Senior and executive management should therefore consider being actively involved in HRIS matters (Boateng, 2007).

4.4.3 Link between organisational goals and HRIS

HR staff does not seem to understand the link between HRIS and organisational goals. This was revealed by a majority of respondents indication that they were not sure if the HRIS meets the goals of the organisation (Bussler & Davis, 2002). Respondents were also uncertain if the HRIS has improved the way the organisation works. The challenge for management is to ensure that the link between HRIS and organisational goals is understood at all levels of the HR department. Management should therefore, consistently communicate strategic objectives and how these support overall organisational goals. A distinct link between these goals and the HRIS must be articulated (Chaffey & Wood, 2005).

4.4.4 Data quality awareness in HRIS

The study found that understanding of data quality by HR personnel is restricted to the intrinsic dimension, accuracy in particular (Redman, 2005). Over-emphasis of one quality dimension could be at the expense of other equally important dimensions. Management should, as primary consumers of HR data, familiarise themselves with other data quality dimensions. This could be achieved through utilisation of consultants, to learn about data quality and practical ways to implement such initiatives (Helfert, Zellner & Sousa, 2002). Moreover, management should raise the awareness of data quality, not only in HR, but throughout the organisation (Eckerson, 2002).

4.4.5 Data quality, system utilisation and usefulness

The study revealed that if the system provides quality data, users are more likely to use it. Moreover, positive experiences with the system are likely to raise the profile of the HRIS as a useful business tool. These results suggest that manager should pay attention to data quality issues, to encourage system usage. They also need to ensure that structures are in place to enhance the user experience with the HRIS (Haines & Petit, 1997). These could be in the form of training programmes, effective Service Level Agreements (SLAs) with IT service desks, to name but a few. Such conditions could lead to better use of the HRIS, thus enabling the organisation to realise return on their HRIS investment (Ngai & Wat, 2004).

4.4.6 HRIS reporting capabilities

The reporting capabilities of HRIS are not adequate. The study revealed that users are not able to easily extract HRIS data (Ryu, Park & Park, 2006). Respondents at staff level indicated that they struggle to extract report on their own. Management also indicated that a significant amount of manipulation is performed once data is extracted from HRIS (Helfert, Zellner & Sousa, 2002). This is usually done to improve data quality. However, it could also compromise certain data quality attributes such as security. Management should utilise their powers to continuously engage their HRIS vendors and demand that these reporting capabilities be improved for the HR user community.

4.4.7 HRIS service quality and user satisfaction

A positive relationship between HRIS service quality and user satisfaction emerged during the study (Bokhara, 2005). Satisfaction with HRIS services was found be related to satisfaction with the system. This could mean that users are not only concerned about the functionalities of the system. They also want to be confident that their system will be adequately supported (Ifinedo & Nahar, 2006). Management should therefore ensure adequate user support for their HRIS so as to realise anticipated benefits (Ifinedo, 2006).

4.4.8 Dedicated role for HRIS management

The study found that where there is a dedicated resource to look after the HRIS, services as well as user satisfaction improves (Haines & Petit, 1997). This could be ascribed to the fact that the primary responsibility of this level of management is the HRIS. This resource

allocation symbolises recognition of the HRIS as a strategic tool. The reporting line of this HRIS management resource was not part of this study. The presence of this resource seems to be associated with end user satisfaction with HRIS (Ifinedo, 2006). Management should therefore consider a resource that understands both the HR and IT environments to be accountable for HRIS service delivery.

4.5 Chapter summary

The chapter began with demographic analysis of the data. A target population of HR personnel at all levels of the organisation was identified. The number of potential respondents identified for the survey was 105. However, only 71 of responded, with 51 completing the survey in full. Semi-structure interviews were held with 12 managers. About half of respondents to the online survey were both information generators and distributors. Majority of respondents were operational personnel. The tenure of study respondents in HRIS was 1 to 5 years.

The chapter continued to discuss study reliability, using Cronbach's coefficient alpha. Quantitative and qualitative data analysis was explained using correlation statistics. The chapter concluded by presenting study findings and implications for management. The next chapter provides a concluding overview. Study conclusions limitations and recommendations for further research are also provided.

5 Chapter 5: Conclusions and recommendations

5.1 Introduction

The study sought to investigate the impact of perceived data quality on HRIS utilisation and perceived usefulness. In order to meet this objective, the previous chapter discussed data analysis, highlighting findings and implications for management. This chapter revisits the research problem, articulating the reasons for the study. Literature review is also revisited in the context of study findings and implications. A summary of the study framework development, empirical study and statistical analysis is presented. Study findings are interpreted in relation to research objectives. Study conclusions and recommendations for further research are presented.

Study findings were found to be consistent with literature studies. However, there were exceptions which are presented and discussed in this chapter. For example, contrary to modern claims, the HR is still viewed as an administrative or operational function (Bondarouk & van der Meyde, 2007). Findings presented adequate information to understand the research problem, which is data quality in HRIS. Moreover, the researcher was able to identify possible recommendations based on study findings.

5.2 Research problem

Chapter 1 introduced the research problem, highlighting that companies who want to be successful should use IT to manage their human resources effectively (Targowski, 2001). Successful management of human resources entails gathering, storing, securing, processing, analysing and distributing information about current and future personnel details. For a smaller organisation, managing HR data could be easier than at large, multinational organisations where volumes of data are significantly large.

Kinnie and Arthurs (1996) found that HRIS utilisation was more prevalent in large organisations, a finding that is consistent with ERP systems (Scapens *et al*, 1998). ERP systems are infamous for being expensive hence there should be overriding business reasons for their purchase (Stratman, 2007).

Like any business investment, ERP systems should consistently justify their costs (Clemons & Gu, 2002). Return on ERP investment is directly linked to the success of the system in enabling the organisation meet its strategic and operational objectives (Stratman, 2007). However, ERP systems' strength (common database) could also be their potential weakness (Xu *et al*, 2002).

It is therefore not surprising that data quality is among common problems in ERP systems (Kim, Lee & Gosain, 2005). The nature of integrated HRIS implies that data quality issues in one functional unit in HR could impact on other areas. For example, incorrectly captured employee gender could distort Employment Equity reports for the organisation, resulting in state penalties (Vosburg & Kumar, 2001). HR data quality is therefore important to any organisation (Helfert, Zellner & Sousa, 2002).

In other documented disciplines, the cost of poor data and/or information is enormous (Redman, 1992; 1995). For example, a passenger airline could lose billions in revenue if their capacity planning system works on the basis of poor data. The same would be applicable to a vehicle manufacturer whose inventory system does not provide quality data. Cost quantifications such as these are not common in HR. Therefore, there seems to be a general lack of attention to data quality in the HRIS environment (see section 4.2.6). There appears to be a further lack of appreciation of the impact of data quality on HRIS utilisation and usefulness (Eckerson, 2002).

The general lack of HRIS research studies suggests that there is a limited body of knowledge in these types of systems. Factors that could enable organisations realise benefits of HRIS are also not adequately researched. One of these factors is data quality. Section 4.6.5 discussed that realisation of HRIS benefit is related to system utilisation.

Kovach *et al* (1999) states that regardless of the technology in use, the value of the system lies in the quality of the information it produces. Therefore, without effective data quality management processes in place, there is less hope of realising HRIS value (Keramati, 2007). The HR department could also fail to assert itself as a business partner. It is for this reason that this research was undertaken, to understand the impact of data quality on HRIS utilisation and usefulness (value-add). Section 4.6.6 revealed that data quality positively influences system HRIS in improving individual and team performance.

5.3 Literature study

Chapter 2 reviewed the discipline of Human Resources, its development and relation to Information Technology. The HR function has evolved from personnel administration, to what is known as Human Resources Management (Lawler, 2005). Section 2.2 revealed that the role of the HR function in an organisation is twofold, that is operational and strategic (Chang & Huang, 2005).

Section 2.3 highlighted that the primary objective of Strategic Human Resource Management is to enhance organisational performance through people (Lawler, 2005). One of the key enablers of SHRM is technology (section 2.4), the HRIS in particular (Ruel *et al*, 2007). Section 2.5 revealed that the type of integrated business technology commonly found at large and medium size organisations is ERP (Al-Mashari, 2002). As it is with strategic HRM, integrated systems are implemented with the intention to improve organisational performance (Velcu *et al*, 2007).

Moreover, section 2.5 revealed that, in order to improve organisational performance, ERP systems must be seen as successful. Information system success was found to be dependent on system utilisation by end-users (Davis, 1989). Utilisation of ERP system could be influenced by factors such as data quality, among others (Ifinedo, 2006).

Section 2.6 discussed how ERP systems are prone to data quality problems due to their tight integration (Xu *et al*, 2002). These problems could potentially hinder benefit realisation for the organisation. Poor data quality could lead to loss of revenues, penalties as well as loss of competitive advantage, among other things. Methodologies such as, but not limited to TDQM (section 2.10) provide frameworks to address HRIS data quality problems (Whyte, 2006).

Utilisation of HRIS was discussed in section 2.6, indicating that Human Resources personnel were not keen on technology, unless it improved their productivity. Academic studies and industry publications on HRIS provided common objectives for HRIS implementations (Ruel *et al*, 2007). Section 2.7 highlighted HRIS advantages such as automation of routine tasks and provision of management information among others (Ngai & Wat, 2004). Preconditions for successful HRIS provided useful input in meeting objectives of this study (Haines & Petit, 1997). Section 2.11 discussed the implications of poor data quality thus providing insights into the magnitude of the research problem (Redman, 2005).

5.4 Construct development

The objective of the study was to investigate the relationship between perceived data quality, system utilisation and usefulness. In order to achieve this objective, a consistent, theoretical and logical construct was developed. The literature review as summarised in section 5.3 provided a theoretical foundation for addressing study objectives (Myers, 1997).

The role of SHRM in improving organisational performance enabled appreciation of the intended role of HRIS. The ERP architecture presented the possible source of HRIS data quality problems. For example, problems could be encountered during data cleansing. Information System success models provided the conceptual framework for this study. TDQM enabled analysis of data quality attributes in HRIS. This culminated in a logical construct for investigating impact of data quality on utilisation and usefulness of HRIS. Figure 5-1 summarises construct development for this study.

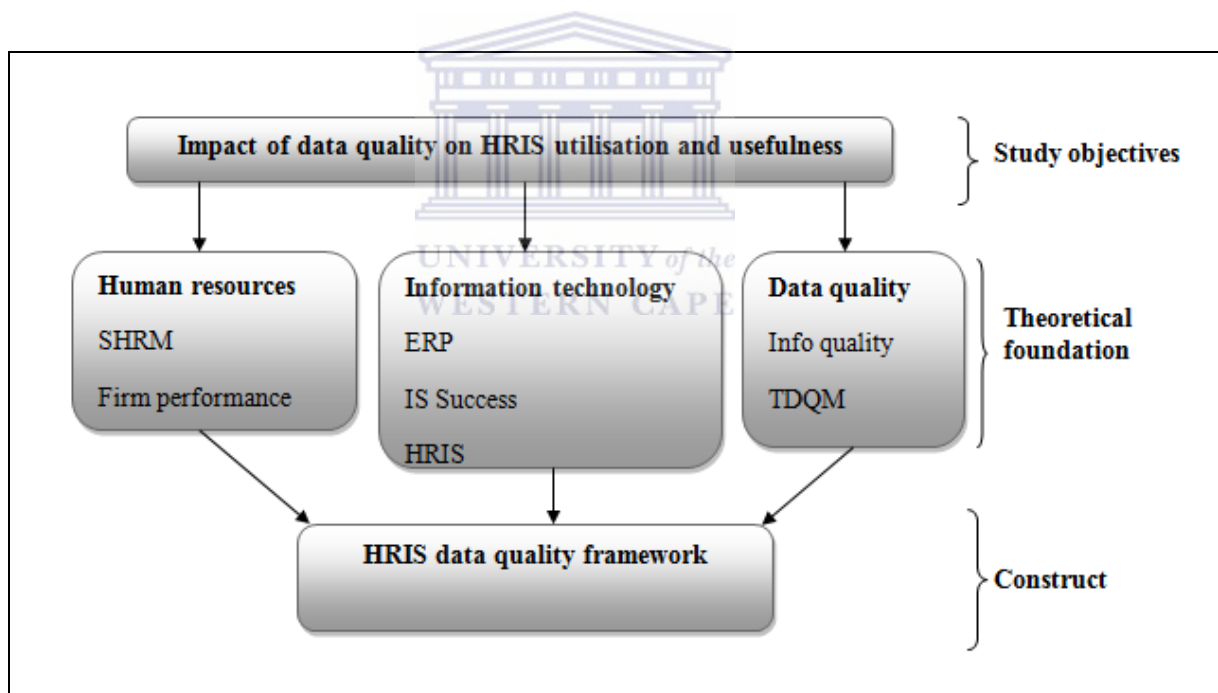


Figure 5-1: Logical construct of data quality in HRIS (source: author)

Figure 5-1 shows various disciplines consulted in order to build a logical framework for this study. The resulting construct has been discussed in chapter 2 and separately depicted in figure 2-7. The central building block for this construct is DeLone and McLean (2003) IS success model. This model was selected because it has been tested in other environments, except HRIS (Almutairi & Subramanian, 2005; McGill, Hobbs & Klobas, 2003).

5.5 Empirical study

Upon construction of the logical framework to study data quality in HRIS, the research design provided methods to conduct the empirical study (Krauss, 2005). In order to enrich research findings, the empirical study was undertaken using mixed research methods (Creswell, 2003). An online survey was employed for quantitative data collection. Descriptive statistics was used for quantitative data analysis. Semi-structured interviews were used to collect qualitative data (Kvale, 1996). Qualitative content analysis was employed in analysing interview data, combining deductive and inductive approaches (Denzin & Lincoln, 2005).

5.6 Statistical analysis

Descriptive as well as predictive statistical analysis was employed for quantitative data analysis (Wegner, 2007). Responses from the online survey questionnaire were arranged in frequency distribution tables. Microsoft Excel 2007 was used for this purpose. Regression models were developed to enable correlation analysis. The Pearson correlation coefficient was calculated to for each of the pair of variables. Regression models revealed a positive relationship between data quality, system utilisation and usefulness. The phenomenon was later confirmed by correlation models based on Pearson's correlate coefficients that are closer to 1.

5.7 Research questions in the light of findings

The research question could be phrased in the following manner;

What is the impact of perceived data quality on HRIS utilisation and perceived usefulness?

The research question was further simplified into the following sub-questions;

- What is the relationship between perceived data quality and system utilisation?
- What is the relationship between utilisation and perceived usefulness of the system?
- What is the relationship between data quality, utilisation and perceived usefulness of the system?

The following sections summarise how the study answered each of the questions. Moreover, insights that emanated from the study are discussed so as to enrich findings.

5.7.1 What is the relationship between perceived data quality and system utilisation?

Quantitative and qualitative data was collected on HRIS data quality and system utilisation. Respondents were asked to rate the quality of their HRIS data according to predefined categories and dimensions. Furthermore, respondents were asked if they would be willing to use the system if it was optional. Statistical formulae were applied to understand the possible relations.

Perceived data quality was found to have a positive relationship with system utilisation and perceived usefulness (DeLone & McLean, 2003). For example, users find it difficult to access HRIS reports and in return receive data of poor quality. These users would be reluctant to further utilise the system (Bokhara, 2005). Their attitudes towards the HRIS are likely to be negative. They will therefore not view the HRIS as a useful business tool (Seddon, 1997). These findings are consistent with literature studies. Kovac *et al* (2002) argued that the ultimate benefit of an IS lies in the value of information it provides. A survey conducted by Eckerson (2002) revealed that poor data quality in general, results in users losing confidence in the information system.

5.7.2 What is the relationship between utilisation and perceived usefulness of the system?

Having established a positive relationship between data quality and utilisation, study participants were asked if they perceived the HRIS as a useful business tool. Responses were modelled in regression tables and statically analysed. The question was also asked in the qualitative interviews. A positive relationship was found to exist between utilisation and usefulness (DeLone & McLean, 2003). The relationship could be used to predict the change on perceived usefulness, based on utilisation behaviours (McGill, Hobbs & Klobas, 2003).

Continued utilisation of the system was found to prompt perceptions that the system was useful. Decreased utilisation would therefore indicate that users do not perceive the system as value-adding (Sabherwal *et al*, 2006). Therefore, organisations could ensure data quality that would encourage system utilisation (Tansley & Newell, 2007). Moreover, they could make training and coaching available to users so as to improve system usefulness (Bedell *et al*, 2007).

5.7.3 What is the relationship between data quality, utilisation and perceived usefulness of the system?

A multivariate correlation model was produced from responses to data quality, utilisation and usefulness. The approach was undertaken so as to understand inferences that could be made on the impact of data quality on utilisation and usefulness (Wegner, 2007). Correlation models revealed a weaker positive relationship between the variables. This was shown by a non-perfect linear model (figure 4-10).

The weaker strength of the relationship could be an indication of the many factors that could affect each variable. For example, data quality could be affected by system factors such as poor configuration (DeLone & McLean, 2003; Esteves & Pastor, 2001). Utilisation could also be affected by user experiences (Ifinedo, 2007). Perceived usefulness could also be influenced by user experiences with previous systems, other than the current HRIS. It is therefore important to realize how organizations could enhance their effectiveness by improving data quality in their HRIS (Jayasundara, 2003).

5.7.4 Emergent research objectives

The study sought to understand further insights into the HRIS data quality phenomenon that could enhance findings and further research objectives. In this regard, the study explored; HRIS role in organisations, understanding of data quality by HR personnel, executive attitudes towards the HRIS, HRIS accountability, HRIS impact and HRIS service quality and user satisfaction among other variables.

Study participants were asked if they used the HRIS for strategic, operation or a combination of operation and strategic tasks. Findings indicate that the HRIS is primarily used for operational tasks (Ball, 2001). The strategic utilisation of the system is still minimal (Ngai & Wat, 2004; Kovach & Cathcart, 1999). In the context of the research question, it would seem that system utilisation and usefulness is operationally inclined (Kovac *et al*, 2002).

The study revealed that HR personnel's understanding of data quality is limited to accuracy and completeness (Wang & Strong, 1996). A significant emphasis is placed on these data quality attributes. The study might not therefore have referred to the holistic concept of data quality but what the users perceive as important data quality attributes. Lack of data quality understanding not restricted to HR. Helfert, Zellner and Sousa (2002) discovered that most

enterprises do not have clearly defined data quality management roles due to lack of awareness.

The HRIS aims to enable business strategy execution (Kovac *et al*, 2002). However, the study found that HR executives do not seem to recognise the HRS as a strategic tool. Instead, the system is perceived as an administrative tool (Morley *et al*, 2006). This finding poses a significant challenge to executives. ERP-based system demand huge investments. They should therefore contribute to the strategic objectives of the organisation (Stratman, 2007).

Respondents were asked if they had a manager responsible for HRIS. The study found that most organisations do not have an HRIS manager. Although data quality is a business responsibility, an HRIS manager could help raise such awareness to business (Friedman, 2006). Moreover, the presence of an HRIS function has been found to be related to user satisfaction with the system (Medina & Chaparro, 2008). The impact of the HRIS manager has not been researched thus leaving room for further research.

Study participants were asked if to indicate if the HRIS has had an impact on their jobs, department and organisation at large. Responses indicated that the HRIS has an impact on individual task and HR department's effectiveness (DeLone & McLean, 2003). However, HRIS has not been found to have an impact on organisational performance (Wright *et al*, 2001). Therefore, further research could explore possible factors affecting HRIS's ability to improve organisational performance (Lawler & Mohrman, 2003). Research could also develop metrics to measure HRIS impact on organisational performance (Boateng, 2007).

A positive relationship was found between HRIS service quality and user satisfaction (Khalil & Elkordy, 2005). Moreover, users expressed that they were satisfied with the HRIS services where there was an HRIS manager. Such satisfaction with HRIS services could also influence system utilisation (Ifinedo, 2006). User satisfaction could also be attributed to the fact that users have a dedicated channel to raise their concerns and suggest enhancements (Khalil & Elkordy, 2005). There is a possibility therefore that HRIS utilisation is influenced by other factors, apart from data quality (Ifinedo, 2007; Bokhara, 2005).

5.8 Conclusions

Contrary to general expectations, the HRIS is primarily utilised as an administrative tool (Fletcher, 2005). System utilisation for strategic tasks seems minimal. Lack of HRIS utilisation for strategic tasks could be attributed to the HR function being viewed as an administrative body. Moreover, there seems to be a lack of executive involvement in HRIS matters. Another reason could be the general perception that IT is a back-office function (Markus & Tanis, 2000). These views have to be changed for the HRIS to be a true enabler of SHRM. Moreover, the system could add value by improving organisational performance (Teo & Crawford, 2005).

HRIS users put more emphasis on accuracy (Intrinsic), completeness (contextual) and security (accessibility). Over-emphasis of these data quality attributes result in system reports that are imbalanced (Redman, 2005). These reports have to be manually manipulated to meet other data quality attributes such as ease of interpretation. Certain data quality attributes such as consistent representation and security are compromised in the process (Hubbard, Forcht & Thomas, 1998).

HR management receives reports that are not a true reflection of data in the HRIS. Manual manipulation of data outside HRIS indicates certain shortcomings (Helfert, Zellner & Sousa, 2002). It could be that HRIS data is of poor quality hence it must be adjusted immediately before being distributed (Eckerson, 2002). Another reason could be limited reporting capabilities of the HRIS. Regardless of the source of the problem, a focused data quality initiative could reveal such problems. This would in turn enable the organisation to take corrective actions.

Data quality in HRIS is generally not poor. There are quality attributes that are not sufficiently catered for when capturing, accessing, updating and reporting HRIS data. Findings indicated that HRIS data is often correct and complete (Olson, 2003). However, accessing reports seems to be difficult for most users. Other users indicated that although the data is correct, they still have to reorganise it into a readable format. Therefore it could be said that although HRIS data is not entirely poor, there is room for improvement. Such improvement is critical if the system is to help achieve strategic goals of the organisation (Boxall, 2003).

Data quality has a positive influence on utilisation and perceived usefulness of HRIS (DeLone & McLean, 2003). Improved data quality encourages users to utilise the system. A feedback loop is initiated, resulting in recommendations for system improvements. Continued utilisation of the system enhances individual and team effectiveness (Chang & Huang, 2005). HRIS has not been found to impact organisational performance. Nevertheless, it is important for organisations to understand data quality categories and dimensions so as to ensure quality in their management information systems (MIS). Organisations should also learn of potential barriers and critical success factors for data quality initiatives (Olson, 2003).

Despite the tight integration and central database of the ERP system, reporting is still a challenge (Eckerson, 2002). HRIS reporting capabilities are inadequate since they lack required flexibility (Boateng, 2007). Organisations often resort to custom report development to meet their unique requirements. Other organisations employ business intelligence applications to address their reporting requirements. Certain vendors like HR-Inform have also identified a niche market for workforce analytics and provided online solutions. HR data is downloaded from source systems and uploaded into online tools for better presentation and analysis. HRIS vendors should therefore consider including standard HR key performance indicators (KPIs) as part of the ERP package (Helfert, Zellner & Sousa, 2002).

User satisfaction could be improved by having a dedicated HRIS manager (Wrigle, Drury & Farhoomand, 1997). Treating the HRIS system as a necessary administrative tool hampers benefit realisation. The presence of a dedicated HRIS manager could ensure that efforts are made to realise return on system investment. This however does not mean that it is the only way to improve HRIS service quality (Bokhara, 2005). In the absence of a dedicated HRIS manager, effective SLAs with vendors and IT departments could also yield positive results (Ifinedo, 2007).

5.9 Contributions to management and HRIS practitioners

Senior and executive management should take a keen interest in HRIS matters (Al-Mudimigh, Zairi & Al-Mashari, 2001). ERP-based HRIS represents a significant investment for the organisation due to high Total Cost of Ownership or TCO (Stratman, 2007). Management involvement is likely to provide a strategic perspective to the HRIS utilisation.

Management involvement should also give the HRIS necessary attention from the IT executives (Wu & Wang, 2006). This should raise HRIS importance in the organisation's strategic toolset. For example, employees might pay attention when communication is sent out requesting them to update their details for tax purposes. A message of this manner coming from senior management is likely to get immediate attention.

Management should raise data quality awareness at their organisations. In order to achieve this, HR technology consulting organisations can be utilised (Redman, 2005). HR business processes that handle employee data might need to be redesigned to address data quality problems (Xu, Nord & Nord, 2002). Management should further define and enforce compliance to data management responsibilities (Olson, 2003). This should not be seen as an HR initiative but rather an organisational one. HR managers should also educate their counterparts in other functional areas of the organisation. A consistent message about data quality from management is likely to yield positive results (Esteves & Pastor, 2001).

Management should remove any foreseeable barriers to system usage such as but not limited to poor IT service. Effective SLAs with IT support units and collaboration with vendors could also be explored (Ifinedo, 2006). Such removal of impediments should pave the way for system utilisation and improvement (Rai, Lang & Welker, 2002). As the study revealed, system utilisation is key in realising return on investment (Stratman, 2007). HRIS benefits at an individual and organisational level should be communicated to the entire organisation (DeLone & McLean, 2003).

HRIS users should engage with software vendors to enhance standard HRIS reporting capabilities (Aberdeen Group, 2007). Although it is an accepted fact that ERP systems cannot cater for unique requirements, emergence of best practice frameworks suggests otherwise. Best practices framework suggests a set of common HR performance indicators such as, but not limited to time to fill a vacant position. HRIS customers should therefore core-develop future system functionalities with the vendors (CedarCrestone, 2008). Vendors should also consider packaging an HRIS with a business intelligence tool in their offering. A bundle like this could be discounted in order to make more attractive.

5.10 Limitations of the study

The study did not entirely control the sample population since it was not practical to do so. The technique of snowballing was employed to maximise available resources (Devers & Frankel, 2000). Knowledgeable informants were utilised, however, respondents could also forward the online survey to their counterparts (Marshall, 1996). Therefore, the dynamics of the study could be different in a controlled environment such as case study research (Onwuegbuzie & Collins, 2007).

The study did not evaluate actual data quality and system utilisation of HRIS (Dick, 2000). The researcher did not access respondent's HR information systems directly in order to assess the state of data quality or utilisation thereof. There are no financial calculations performed in order to measure HRIS usefulness. The study focused on user perceptions in order to draw conclusions about these variables. A study that employs an audit-based approach to measure these variables could therefore arrive at somewhat different conclusions. An audit-based approach would investigate actual HRIS data and access records in order to draw conclusions.

In IS literature, a distinction is made between voluntary and involuntary utilisation of the system (Davis, 1993). In voluntary utilisation, users utilise the system at their own will. It could be due to the value they see at a personal level. Involuntary or forced utilisation occurs where users are reluctant to use the system (Seddon, 1997). This study did not attempt to distinguish between these concepts, thus adopting the former (Bokhara, 2005). A study that distinguishes between the two could reach different conclusions, based the type of utilisation being measured.

The presence of the HRIS manager was brought up in the study responses. The objectives of having this role were not investigated in this study. The responsibilities of the role were also not explored. It could be possible therefore that the role was not created solely for service delivery. A thorough investigation of this role could possibly offer insights about data quality and the role of HR as a strategic partner.

5.11 Contributions to research and recommendations

This study investigated the impact of perceived data quality on system utilisation and perceived usefulness. The limitations of the study have been highlighted in the previous section. The study also presented opportunities to advance knowledge in the HRIS domain. It

could be said that this study presented the foundation for research in the areas of HRS economic value, practices and executive attitudes among others. Opportunities exist also to broaden HR's understanding of data quality. The following paragraphs provide brief overview of research directions that could emanate from this study.

The barriers and critical success factors for data quality initiatives in HRIS could be explored. Interviews with senior HR managers revealed that data quality initiatives are not common in HR (Swartz, 2007). This is not surprising since HR's understanding of data quality is not holistic enough to warrant such significant efforts (Vosburg & Kumar, 2001).

Data quality initiatives are complex and require resources in terms of finance and people. An analysis of impediments and critical success factors for HR data quality initiatives could be worth undertaking (Wang, 1998). Result from such analysis could help organisations adopt appropriate approaches. They could also avoid potential pitfalls in their data quality initiatives (Morse *et al*, 2002).

This study showed that service quality could be one of the determinants of HRIS success (Wu & Wang, 2007). However, this was a secondary observation hence it is not regarded as the single possible determinant. A study that investigates the determinants of HRIS user satisfaction could therefore be necessary (Gable, Sedera & Chan, 2003). Results of this study could give vendors and HRIS managers other avenues to influence user satisfaction (Bokhara, 2005).

Respondents indicated that some their organisations employ a dedicated manager for the HRIS (Haines & Petit, 1997). The conditions that lead to such a role being created could be worth investigating. The details of the role and its reporting line could be studied. The impact of this role (if any) on HRIS utilisation and value add, to name a few (Ramlall, 2003). For example, a comparison could be made between the performance of organisations who have an HRIS manager and those who do not (Lawler, 2005).

Furthermore, the impact of the HRIS manager in translating HR business strategy into executable IT objectives could be explored (Wang & Shyu, 2007). Results from such studies could enable organisations to decide whether the role is critical or not (Ramlall, 2003). The preconditions for HRIS manager effectiveness could also be studied. Organisations planning to introduce the role would also be better prepared regarding best ways to introduce it.



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7 Appendices

7.1 Research authorisation letter



7.2 Survey instruments

7.2.1 Online survey questionnaire



UNIVERSITY *of the*
WESTERN CAPE

Human Resources Information System (HRIS)

-
Data/information quality survey

2010

UNIVERSITY *of the*
WESTERN CAPE

A survey conducted in fulfilment of a Master of Commerce (Mcomm) degree in Information Technology at the University of Western Cape.

By

Khulekani Enock Dlamini

Section A – Company profile

1) What is your role in the HRIS

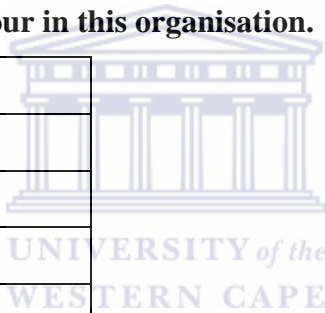
HR Information Consumer – i.e. you use information from HRIS	
HR Information Generator – i.e. capture, edit, process information on the HRIS	
HRIS Support – i.e. configure, program and support HRIS for information capturing, maintenance and reporting	

2) How many years have you been in the HRIS environment in your career?

1-5 years	
6-9 years	
10-15 years	
16-20 years	
21-29 years	
21-29 years	

3) Indicate the level of your in this organisation.

Operational personnel	
Operational personnel	
Junior Management	
Middle Management	
Senior Management	
Executive Management	



Section B – Company profile

1) How many employees (permanent & temporary) are handled by your HRIS?

1000 - 3000	
4000 - 6000	
7000 - 10 000	
1000 - 3000	
4000 - 6000	
7000 - 10 000	
11 000 – 20 000	
More than 20 000	

2) Select the relevant sites (locations/offices) that use the same HRIS.

Local (South African)Offices only	
Local and International Offices	

3) Which Industry is your company?

Utilities	
Financial services (Banking)	
Financial services (Insurance)	
Professional Services	
Telecommunications	
Retail	
Manufacturing	
Petrochemicals	
Mining	
Education	
Government	
Other	

4) What do you think were primary drivers (objectives) for implementing an HRIS in this your company?

Business Process Integration	
Operational efficiency	
Strategic management of Human Resources	
HR Report consolidation	
Corporate strategy execution	
I Don't Know	
Other	

5) Do you think your HRIS meets the overall strategic goals of the HR department and the overall organisation?

No		Yes		I Don't Know	
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Section C - HRIS profile

1) Which HRIS are you using?

SAP HCM		Microsoft Dynamics HR	
Oracle HR		JD Edwards HR	
PeopleSoft HR		I Don't Know	
Mincom Eclipse HR		I Don't Know	
CRS		Other	

2) How long have you been using your current HRIS in this organisation?

1-3 years	
3-6 years	
6-9 years	
More than 10 years	
More than 20 years	

3) Which of the following functionality is used in your integrated HRIS?

Payroll		Labour/Employee Relations	
HR (personal information)		Manager Self-services (MSS)	
Learning and Development/E-learning		Organisational Structure Management	
Compensation Management			
Employee Benefits Administration			
Recruitment /E-recruitment			
Performance Management			
Workforce Planning			

7.2.2 Semi-structured interview guide



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HRIS data quality - Interview guide

Date	
Time	
Resp. title	
Industry	
Province	
Response count	

Respondent profile	Response
What is your role in this organisation?	
How long have been in this role?	
How long have been in an integrated HRIS environment in your career?	
Have you been formally trained in the current HRIS? How long ago?	

Organisational profile	Response
What is the total number of employees in this organisation?	
What is the organisation's attitude towards Information Technology?	
HRIS profile	Response
Which HRIS are you using?	
How long has the organisation been using the current HRIS?	
What do you think were the main objectives for implementing the current HRIS?	
Do you think the current HRIS meets these goals? Why?	
Do you have an HRIS Manager? Why?	
Data/information quality	Response
What is your understanding of data quality?	
What do you think of the quality of data in your HRIS? Why?	
If it is not of high quality, what do you think lead to the situation?	
What do you think could remedy poor data quality in your HRIS? Why?	

HRIS utilisation (Use)	Response
What are general attitudes towards the HRIS in this organisation? Why?	
Do you think the HRIS is optimally utilised? Why?	
HRIS usefulness (impact)	Response
Do you think the HRIS is a useful business tool? Why?	
How has the HRIS improved individual employee effectiveness in this organisation?	
How has the HRIS improved departmental effectiveness in this organisation?	
How has the HRIS improved organisational effectiveness in this organisation?	
HRIS satisfaction	Response
From a technical (IT) perspective, who supports your HRIS? Are you happy with their service? Why?	
Are you satisfied with the quality of information reports produced from your HRIS? Why?	
Are you satisfied with the functionality of the HRIS? Why?	
Are you satisfied with the overall HRIS? Why?	