DURBAN UNIVERSITY of TECHNOLOGY

# AN INVESTIGATION INTO DATA MANAGEMENT AS A STRATEGIC INFORMATION TOOL AND ITS IMPORTANCE AT THE DURBAN UNIVERSITY OF TECHNOLOGY

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## ABSTRACT

The purpose of this study was to investigate data management as a strategic information tool and its importance at the Durban University of Technology. The problem revolved around*, inter alia,* data management and data accuracy as structured interventions impacting on sound decision making. There were many challenges identified with regard to data management at the Durban University of Technology.

The research design adopted a quantitative methodological approach that was used for collecting data through the use of a precoded self administered questionnaire. The empirical component involved a survey method considering that in was an in-house investigation and the target population equated to only 174 respondents. A significant response rate of 74% was obtained using the personal method for the data collection. Several hypotheses were formulated relating to data quality initiatives, data owners and their responsibility and frequency of data analysis in order to determine accuracy. These were tested using the Pearson chi-square test as well as data that was analyzed to determine frequencies and percentages of responses. The data was analyzed using the computerized Statistical Program for Social Sciences (SPSS) program. There were some significant findings that emerged from the empirical analysis. A highly significant finding was that 95.31% of the respondents strongly agreed that data management and integrity is of utmost importance at the Durban University of Technology.

One of the recommendation suggest that an imperative for the Durban University of Technology to manage its data as an asset, a policy on data integrity and integration policy should be developed and implemented. Another recommendation highlighted and staff should strive to attain proper classification on the database, considering that this directly impacts on the accuracy of the HEMIS submissions to the Ministry of Education for the state allocated subsidy. The study concludes with directions for further research as well.

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## DEDICATION

This study is dedicated to my DAD and my late MUM.

Thank you for having constant faith in me.

**DECLARATION**

I hereby declare that the dissertation submitted for the degree M Tech: Public Management in the Department of Governance and Economic Development at Durban University of Technology is my own original work and has not previously been submitted to any other institution of higher education. I further declare that all sources cited or quoted are indicated and acknowledged in the comprehensive bibliography.

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Ramani Francis

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# CHAPTER 1

# OVERVIEW OF THE STUDY

## 1.1 INTRODUCTION

Data management refers to techniques used to organize, structure, and manage data including database management and data administration (Wang, 2006:569). This definition is comparatively broad and encompasses a number of topics namely; data governance, data integrity, data architecture, analysis and design, data security, data quality management. The focus of this study is based on data integrity as an essential component in relation to data management. According to Beyda (2000:117) data integrity is the prevention or correction of possible errors in data transmission.

Data integrity is a necessity at the Durban University of Technology (DUT), especially in relation to the mandatory data submissions for a specific reporting year to the Department of Higher Education and Training (DHET) from which the institution's subsidy is derived. The institution's subsidy is also known as Government appropriations. Bunting (1994:125) provides the definition as "the fund to which are assigned the amounts received from the central government under the universities' subsidy formula (for both current and fixed asset expenditure). The central government's share of the interest and principal due on long term loans e.g. for buildings or major capital equipment which is also assigned to this fund".

Ensor (2004:339) explains how the newly elected government was faced with the challenge of nurturing democracy from the apartheid regime. Thus, in the past 10 years there has been a significant change in the higher education funding environment. Consequently, the Department of Higher Education and Training (DHET) requires a high level of data integrity from a management information reporting perspective.

One of the most significant challenges faced at the Durban University of Technology is maintaining data integrity throughout the institution. According to Davenport (1994:122), “effective information management must begin by thinking about how people use information and not how people use machines”. There is and must be only one main purpose towards improving data management which is to improve customer and stakeholder satisfaction by increasing the efficiency and effectiveness of business processes in an institution.

## 1.2 THE PROBLEM STATEMENT

There are many common challenges regarding data management at the Durban University of Technology. These mainly comprise a lack of adherence to policies and procedures, lack or the absence of verification of data following capture, as well as staff who have a limited knowledge relating to the impact of incorrect data. This may negatively compromise data integrity and data accuracy. The absence or lack of data management could possibly result in substantial financial loss which can be catastrophic to the institution. Therefore, this study looks at data management as a strategic tool and its importance to the Durban University of Technology**.** Rajan, Emmanuel and Chary (1985:11) state that “Management Information Systems may be defined as an integrated, man/machine system for providing information to support operations, management and decision making functions in an organization”. This system often utilizes computer hardware, software, manual procedures, management decision models and the database. With data management in place at the Durban University of Technology, the management information that is provided is relevant, accurate and current for different activities within the university. Eksteen (1981:2) explains how information and the ability to analyse the information must be available to support a sound decision making process, i.e. a good management information system has become indispensible and is integral to strategic planning for management decisions at a macro level.

## 1.3 AIM AND OBJECTIVES

The primary aim of the study is to investigate data management as a strategic information tool and its importance at the Durban University of Technology (DUT). The objectives of the study are:

- To improve awareness of data management within the Durban University of Technology and help stakeholders investigate the state of data management.

- To provide stakeholders with relevant information regarding data management and effectively apply this information in order to improve data integrity.

- To effectively utilize data management as a strategic information tool in order to provide all levels of management and stakeholders with management information to support strategic decision making, planning, policy development and quality processes.

- To explore the feasibility and effectiveness of data management using Higher Education Management Information System (HEMIS) to the DHET.

- To determine what processes exist for data verification.

- To establish to what extent there is non adherence to policies and procedures.

- To determine what constitutes best practice in data management and data integrity at DUT.

## 1.4 SIGNIFICANCE OF THE STUDY

In the early 1990's, various investigations were launched into higher education policies for post-apartheid South Africa. It was in these debates that the South African Post Secondary Education (SAPSE) funding formula was established. It was later established that it was a flawed document as suggested by Bunting (1994:141-149) and cited by Cloete, Maassen, Fehnel, Moja, Gibbon and Perold (2007:93). The SAPSE funding framework which was established in 1982 for the historically White universities applied throughout the late 1980s and early 1990s to all other universities and technikons, was eventually abolished. This was essentially an apartheid funding framework and it could not be used in the current transformed higher education system. The New Funding Framework (2003) gives advantage to comprehensive and traditional universities. It is also graduate output driven. The HEMIS transformed system is committed to equity and strong linkages with national development needs. It was argued by most stakeholder Institutions that with the abolition of the SAPSE funding framework, it would result in major benefits for some groups of institutions and equate to major costs for others.

Thus, the significance of this study is to ensure an effective and efficient way for the data to be maintained in order to support the mission and vision of the Durban University of Technology. Bitzer (2009:354) states that South African universities have become highly unpredictable. Universities have moved from an isolated, divided system in the apartheid era toward a single coordinated system. This system has higher levels of participation and responsiveness. Yet it is within a developing economy and poor quality of primary and secondary education that South African higher education therefore faces a multitude of challenges. Bitzer (2009:354) further explains how conditions of unpredictability further worsens the complexities of planning, policy setting and decision making which then impacts negatively on corporate governance and management activities.

## 1.5 SCOPE OF THE STUDY

This study is an in-house investigation and the questionnaires will be directed to all Executive Deans, Heads of Departments, Human Resources Managers, other Human Resources staff within faculties, Information Technology Support Services staff, Management Information staff and all Faculty officers as well as staff within faculty offices at the Durban University of Technology. They represent the stakeholders within the Durban University of Technology and it was envisaged that a broad spectrum of views would be obtained. Informed consent was obtained via the office of the Deputy Vice Chancellor Technology, Innovations and Partnerships at the Durban University of Technology. The findings of this research cannot be generalised to other higher institutions in KwaZulu-Natal or South African Universities because of the different variables that come into play.

## 1.6 LITERATURE REVIEW

The Department of Higher Education and Training (DHET) has drastically changed the way in which higher education institutions are reporting their data. The unit record collections for students, staff and space replaced the collection of data in the form of SAPSE tables. On 19 March 1999, all higher education institutions (HEI's) were informed about the main features of the new system through the document entitled "A New Higher Education Statistical Reporting System for Students and Staff – A Concept Paper". The Department of Higher Education and Training (DHET) then provided all institutions with the Valpac software in order to make the HEMIS submission. The first data set was in respect of 1999 student data and 2000 staff data. Thus, a good management information tool/system has become indispensible for sound strategic planning, management and operation control at the Durban University of Technology.

The focus of the literature review is derived from similar disciplines involving data integrity, management information and data management. The secondary data offers an indication of the extent of literature related to this research. Vosburg and Kumar (2001:21) explain how the integrity of data and data management affects the quality of decisions taken. Protecting the integrity of data can be difficult and becomes more strenuous as the size and complexity of business and its systems increase.

### 1.6.1 REPORTING SYSTEMS

The Department of Education's New Higher Education Statistical Reporting System for Students and Staff – A Concept Paper (1999:2) reiterates that the implementation of the policy framework for the transformation of the higher education system will be information intensive requiring the development of quantitative and qualitative analytical skills and capacities that translate into reliable, high quality data. Further, this concept paper (1992:2) outlines that there is a need for timely, comprehensive, good quality statistical data. This data will be required as an information base that is of fundamental importance in the development of plans and strategies, the evaluation of achievement of goals and targets, and the development of policy mandates for Government and institutions.

Crespi and Williams (2007:4) state that there are costs relating to a lack of data integrity and data management, namely, that in some extreme cases where reporting is flawed or data lost then there could be some loss in financial data. These costs are difficult to measure but can be catastrophic. When it comes to corporate credibility, the lack of data integrity and ineffective data management can have a negative impact on corporate image and sound decision making.

### 1.6.2 ORGANIZATIONAL VALUES

Evans (2008:21) states that it is essential to incorporate principles in organizational values such as:

- Customer focus.
- People.
- Continuous improvement.
- Integrity.
- Agility.
- Data based decision making.

Evans (2008:426) also states that it is essential that managers keep track of improvement efforts, to encourage other managers and to provide recognition when any key milestones are reached.

### 1.6.3 DATA INTEGRITY

Evans (2008:22) highlights how some organizations have changed their focus in order to drive the error rate down to zero by using the following initiatives:

- New technologies to reduce the potential for human error.
- Restructuring and increasing the level of quality assurance staff.
- Creating a more streamlined and comprehensive training systems.
- Re-engineering the core manufacturing processes to make them more efficient and simplified so as to reduce and prevent errors.
- Investing in facilities to enable more efficient and effective adoption of new technology.

### 1.6.4 MANAGEMENT INFORMATION

Haag, Cummings and Mccubbrey (2005:4), define management information systems as the function that plans, develops, implements and maintains information technology hardware, software and applications that people use to support the goals of an organization. According to Haag, *et al*. (2005:4), management information systems involve collecting, recording, storing and basic processing of information including:

- accounting records, financial statements, management reports; and
- operation records, inventory, equipment repair and maintenance.

Management information systems use the above tools to implement, control and monitor plans. Ward (1995:17) states that the idea of providing executive management with pertinent information directly from information technology based systems is not new. It was one of the objectives of the management information systems era, but an objective that was rarely achieved. There are two main reasons for this shortcoming (Ward, 1995:17):

- Defining what is pertinent to executive management is very difficult and subject to rapid change; and
- The need for external information about the business environment to be included with internal information.

The following are a few objectives, as asserted by Singh (2007:7), for an effective management information system:

- To help facilitate the decision-making process by providing information in the proper time frame; and
- To provide information to each level of management to effectively carry out their functions.

Singh (2007:17) also discusses the limitations in management information when he warns that information cannot be provided in information packages to analyse the available information before making decisions. When it comes to data integrity and data management in management information, it is essential to highlight the quality of input and processes (Singh, 2007:21). It is contended that adequate attention is not given to the quality control aspects of the inputs. The process and the outputs leading to insufficient checks and controls in management information may thus compromise the accuracy of data capturing and result in huge financial losses.

### 1.6.5 DATA MANAGEMENT

Evans (2008:41) highlights that data management should be a regular part of daily work. In order to eliminate problems at the source, identify problems that need correction and be driven by opportunities to do better. Further, Evans (2008:41) advices on the following advantages:

- Enhancing value to the customer through new and improved products and services.
- Improving productivity and operational performance through better work processes and reductions in errors, defects and waste.
- Improving flexibility and responsiveness.
- Improving organizational management processes through learning.

By associating data management with quality systems, Evans (2008:114) identified three important benefits, namely:

- Effective data management reduces the direct costs associated with poor quality.
- Improvements in data management tend to lead to increase in productivity.

- Improvements in quality and productivity lead to increase in profits.

Evans (2008:247) further emphasis process management which can be aligned to data management. It involves design, control and improvement of these activities needed to achieve a high level of performance. This helps to prevent defects and errors, eliminate redundancy and leads to better quality and improved organizational performance.

### 1.6.6 EFFICIENCY AT HIGHER EDUCATION INSTITUTIONS

Efficiency as suggested by Cloete, *et.al.* (2007:278), the National Commission on Higher Education Report, 1996 and the 1997 White Paper on Higher Education Transformation began with equity as the first transformation principle. The Council on Higher Education Report of 2000 started with effectiveness and efficiency challenges and then highlights the imperative of equity initiatives. Most recently, the National Plan for Higher Education (Department of Education 2001:1.1) highlights the challenges facing higher education with human resource development. In simple words efficiency refers to cost while – effectiveness is doing the same with fewer resources or doing more with the same resources.

## 1.7 RESEARCH METHODOLOGY AND DESIGN

Accurate and efficient data collection is central to any research. This research adopts a quantitative paradigm as close ended questions were asked in the research instrument. Quantitative research, as defined by Cooper and Schindler (2006:198), attempts precise measurement of something. Quantitative methodologies usually measure consumer behaviour, knowledge, opinions or attitudes. These answer questions related to how much, how often, how many, when and who. Quantitative data often consists of particular responses that are coded, categorized and reduced to numbers so that these data may be manipulated for statistical analysis Cooper and Schindler, (2006:198).

### 1.7.1 SECONDARY DATA

Secondary data is that which has been collected, collated and analysed by others as opposed to that which one would have collected personally. The secondary data used in this research was the following, as listed by Riley, Wood, Clark, Wilkie, Szivas (2000:107):

- Central and local government studies, reports, policies and rules.
- Academic journals.
- Textbooks.
- Other dissertations on similar topics.
- Other policy documents from the Department of Higher Education and Training.
- Other published material from Department of Higher Education and Training workshops.
- Media Articles.
- Internet sites and web pages.
- Audit Reports from DUT.
- SATN correspondence.

### 1.7.2 PRIMARY DATA

According to Brewerton and Millward (2000:104), the proper construction of a questionnaire is critical to the accuracy of responses. Respondents would be contacted telephonically informing them of the purpose/reason for the completion of the questionnaire. The questionnaire was hand-delivered, e-mailed or faxed through to the target respondents. The respondent had approximately one week to complete the questionnaire. However, further time was permitted, if requested in order to encourage respondents to complete the questionnaire. A covering letter was attached and a summary of the findings would be e-mailed to the respondents on completion of the study.

### 1.7.3 RESEARCH DESIGN

This study adopted the quantitative method where precoded structured questionnaires were administered to the target respondents.

### 1.7.4 MEASURING INSTRUMENT

Ghauri, Gronhaug and Kristianslund (1995:41) explain that the quality of information depends considerably on the measurement procedures used in the gathering of data. The research instrument to be used in the collection of data would be the survey questionnaire. In addition, a letter of informed consent was obtained from the Research Director prior to conducting the empirical investigation at the Durban University of Technology.

### 1.7.5 TARGET POPULATION

This study is an in-house investigation and thus the target population compromised of all Executive Deans, Heads of Departments, Information and Communication Technology staff, Management Information staff and all Faculty officers as well as the staff within the faculty office. The total number of target respondents was obtained from the institutional ITS database was 174.

### 1.7.6 SAMPLING TECHNIQUES

Page and Meyer (2000:99) explain the non-probability sampling as judgmental, accidental, snowball, quota and probability samples as simple random, stratified, systematic and cluster sampling techniques. This research used the survey method, since the target population was small and therefore so there was no need to use any of the sampling techniques.

### 1.7.7 SURVEY METHOD

Creswell (2009:146) contends that the survey method follows a standard format and as a guide the following questions should be used as a checklist.

- Is the purpose of a survey design stated?
- Are the reasons for choosing the design mentioned?
- Is the nature of the survey identified?
- Are the population and its size mentioned?
- What is the timeline for administering the survey?

Collis and Hussey (2003:66) state that if the target population is small, data can be collected from the entire target population. Thus, this study contained a small target population and it was therefore most effective to use the survey method.

### 1.7.8 PILOT STUDY

The data gathering phase of the research process begins with pilot testing. According to Cooper and Schindler (2006:76), a pilot test is conducted to detect weaknesses in design and instrumentation. In very small populations, pilot testing runs the risk of exhausting respondents. This risk is however overshadowed by the improvements made to the design. In the pilot study, questionnaires were randomly administered to Heads of Department, staff from the Information Technology Support Services (ITSS) and Management Information (MI) which equated to eleven.

### 1.7.9 CONSTRUCTS OF RELIABILITY AND VALIDITY

As discussed by Melville and Goddard (2001:41), reliability and validity are two important criteria for the instruments. "Reliability means the measurements made are consistent, if the same experiment is performed under the same conditions, the same measurements will be obtained. Validity means that an instrument measures what it is intended to measure, and that it measures this correctly" (Melville and Goddard 2001:41).

## 1.8 DATA COLLECTION METHODS

Data collection methods are an integral part of research design. According to Sekaran (2003:223), there are several data collection methods namely, interviews – face-to-face, telephonic, electronic media and structured questionnaires. For this study, the personal method of administering the questionnaire was used. In the case of academic head of departments, the questionnaire was left with the secretary for completion by the head of department. According to Sekaran (2003:223) the personal method also ensures a high response rate. The researcher administered the questionnaires to the target respondents using the personal method.

## 1.9 ANALYSIS OF RESULTS

It is essential to consider using the proper software package that can help manage and analyse the data. For the empirical analysis, the Microsoft Excel 2007 was used for the preliminary analysis. The SPSS (Statistical Package for the Social Sciences) Version 16 for Windows was used for the appropriate statistical tests to be performed.

## 1.10 STRUCTURE OF THE CHAPTERS

Chapter 1 highlights the overview of the study the background, motivation for the study and the key objectives.

Chapter 2 of the study examines the literature relating to the importance of data integrity as a management information tool.

Chapter 3 focuses on the research methodology and design.

Chapter 4 shows the analysis of the data in tabular and graphical format. It also includes discussion of the findings and integration of author sources from the supporting literature.

Chapter 5 focuses on the conclusion and recommendations of the study.

## 1.11 CONCLUSION

This chapter highlighted the research problem, the objectives of the study as well as the literature pertaining to the study. It gave a brief insight into the research design, the target population, the measuring instrument and data collection methods. The subsequent chapter deals with the literature review pertaining to the study.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 INTRODUCTION

A literature search is defined by Fink (2005:3) as a systematic, explicit method for identifying and evaluating the completed and recorded work produced by accredited authors of text books, journals, articles and other tertiary sources. Literature review as explained by Sekaran and Bougie (2010:38) is a step by step process where published or unpublished work from secondary data sources related to the study are cited. An aspect of a literature review is that it should demonstrate a critical awareness of relevant knowledge in the field. According to Gray, (2009:99), the literature review includes the following:

- Providing an up to date understanding of the subject.
- Identify issues/themes that present themselves for further research.
- Present methodologies/tools that have been used in the other relevant studies.

## 2.2 STATUTORY REPORTING TO THE DEPARTMENT OF HIGHER EDUCATION AND TRAINING

The Higher Education Qualifications Framework Higher Education Act (2007:18) explains the importance of statutory reporting to the Department of Higher Education and Training. The qualification data submitted determines the total number of units of state subsidy approved by the Minister of Education. The subsidy unit per qualification is an integral part of determining the full-time equivalent student. The subsidy is allocated according to the number of full-time equivalent student enrolled and full-time equivalent student passed The Higher Education Qualifications Framework Higher Education (2007:18).

### 2.2.1 SOUTH AFRICAN POST SECONDARY EDUCATION (SAPSE)

The Department of Education's New Higher Education Statistical Reporting System for Students and Staff – A Concept Paper (1999:3) highlights the need for the submission of statistical data. Good quality statistical data will be required as an information base that is of utmost importance in the development of plans and strategies, achievement of goals and targets and the development of policy advice for Government and within higher education institutions. The SAPSE process for collecting and accessing such statistical information did not serve very well in the past. The limitations were identified within The Department of Education's New Higher Education Statistical Reporting System for Students and Staff – A Concept Paper (1999:3) as:

- An expensive, cumbersome and slow process involved in compiling, checking and correcting the data in the SAPSE returns.
- An inefficient, inflexible and difficult to maintain systems for storing data.
- The difficulties in accessing and manipulating the SAPSE data.
- The lack of transparency of the SAPSE data to stakeholders.
- The collection of some data that was never used.

The limitations of the SAPSE system had unfortunate consequences for both institutions and the Department of Education. The SAPSE system has been replaced with new system HEMIS and this appears to be generally accepted throughout the higher education system in South Africa.

### 2.2.2 HIGHER EDUCATION MANAGEMENT INFORMATION SYSTEM (HEMIS)

The benefits of HEMIS as contained in The Department of Education's New Higher Education Statistical Reporting System for Students and Staff – A Concept Paper (1999:7) includes the following:

- It would reduce the institutional cost for assembling the data.
- Reduction in costs for the institution and the Department of Higher Education and Training relating to the checking and correction of data.
- The Department of Education will be able to store, access and analyse data more efficiently and effectively.
- There will be more timely provision of data to the Department of Higher Education and Training.
- When the system is fully operational, it will be possible for institutions to compare themselves to national data.
- The Department of Higher Education and Training will be able to undertake a more flexible analysis of data for strategic decision making.

The computer software provided by DHET, that is currently used by all HEI's for HEMIS reporting, is Valpac. This software contains a Help File that has specifications for the unit records of student, staff and building space collections. This help file is numbered accordingly for the specific version and it is subject to change whenever it is revised.

### 2.2.3 ACCURACY OF DATA IN THE SUBMISSIONS TO DHET

Valpac Help File (2011:3) warns that the responsibility for ensuring the accuracy and completeness of the data in the returns provided to the Department rests with the institution. To ensure the accuracy and completeness of the data, institutions are required to use Valpac to generate detailed validation reports, distribution reports and summary reports. These reports are analysed to ensure the quality of the data. Any data conditions which lead to fatal errors being indicated in validation reports must be corrected prior to sending the submission to the Department of Higher Education and Training.

The DHET will not accept submissions which contain data conditions that lead to generation of fatal error messages during edit validation runs. Data conditions that lead to the generation of warning error messages must be inspected by institutions. Institutions must be confident that such data are appropriate and correct and provide assurance to that effect to the Department. In addition to inspecting and resolving validation error messages, institutions must also inspect the data that can be generated through Valpac comprehensive reports. The institution must be confident about the accuracy and reasonableness of the data summarized in such reports prior to sending the data to the DHET. Enfield (2010:124) suggests that accuracy of the data must be taken in the context that it is required both from where it is sourced as well as how it will be used.

### 2.2.4 FINANCIAL IMPLICATIONS FOR THE INSTITUTION

According to the Ministerial Statement (2009:3) the following comment was made regarding the reporting to the Department of Higher Education and Training (DHET):

- The Department of Higher Education and Training will be checking the HEMIS submissions. If a review suggests that the data submissions are wrong, HEI's may be requested to correct the errors and re-submit. If it is necessary, then the HEI's block grants for the specific year may be re-calculated, and over-payments will be deducted from the new block grant to be paid to the institution.

## 2.3 DATA MANAGEMENT

Kumar and Palvia (2001:155) mention the following potential problems with respect to data management:

- Most internal data is captured by human sources and that in it self can be a very complex problem.

- Transmitting data from where it originates to the place where it is required for processing and decision making is very important for controlling and coordinating the operations of organizations.
- All staff needed to agree on common definitions of data entities and attributes.

Vinten (1994:10) refers to data management as “natural as the air we breathe and as a result data management should represent a valuable additional technique for the executive management to adopt when his/her judgment dictates”. When faced with any incomprehensible set of data, the first task would be to determine some sort of pattern to bring some order out of the complexities of data. Perry (2008:18) argued that data management should aim for the following:

- Provide data to fulfill the information requests by a variety of users.
- Maintaining the integrity of data by restricting unauthorized access. However users have to be able to update incorrect data if necessary.
- Have the ability to evolve and develop as the organization expands.

Perry (2008:18) also highlights some of the advantages of data management as:

- Reduction in data redundancy. Data is stored once and accessed in many forms.
- Data integrity. By avoiding data redundancy, data integrity is accomplished to a certain extent.

## 2.4 MANAGEMENT INFORMATION

Goodhue, Kirsch, Quillard and Wybo (1992:11) stress that many managers have an increased appreciation for the role of data in meeting the challenges of today’s business environment. Accessing data from various organizational

subsystems is often required to respond to the demands of an increasingly competitive global market place. Many large organizations are finding that even if they can access data from multiple functions, the lack of logical data integration across information systems makes it difficult or impossible to answer cross-functional or cross-divisional questions as espoused by Goodhue, *et al.* (1992:11).

Ein-Dor and Segev (1978:1635) focus on the purpose of management information systems which is a concise, explicit statement of the role assigned to a particular information system in the organization. The roles have been identified by Ein-Dor and Segev (1978:1635) as:

- A decision and planning tool.
- An analogue or model of the organization.
- An information bank.
- A problem finding and solving aid.

There is overlap between the above four roles and any management information system may contain elements of each of them.

Martin and Overman (1988:73) describes a management information system as an interconnected set of procedures and mechanisms for data accumulation, storage, and retrieval which is designed to convert organizational data into information appropriate for managerial decision making. Management information systems generally summarize data produced by transaction based systems which is stored in organizational databases for analysis.

### 2.4.1 REQUIREMENTS OF MANAGEMENT INFORMATION SYSTEMS

Van Rensburg (2008:90) and Alter (2006:172) list the following requirements of an effective management information system:

- Quality - the more accurate the information, the higher the quality and the more managers can rely on it when making decisions. Quality therefore relates to reliability of the information. The higher the desired level of reliability, then more time will be spent, and the costs will be also higher.
- Timeliness – for effective control, managers must take corrective action before too great a deviation from the standard occurs. Information should thus be available timeously for the necessary action to be taken.
- Quantity – in order to make accurate and timely decisions, managers need sufficient information. The information should be relevant to the decision being made. Irrelevant information impedes decision making.

### 2.4.2 WELL STRUCTURED MANAGEMENT INFORMATION SYSTEM

Tabatoni, Davies and Barblan (1994:6) contend that the data collected should provide relevant material available at the right time to support the right change. Such data should structure signals which would impress the organization with a sense of change in process. This data must magnify and transform into management information data. Data can monitor change in the environment or in the strategies applied in other institutions as benchmarks. Tabatoni, *et al*. (1994:6) further state that it is clear today that significant management information can be drawn from staff experience. It is difficult for management to convince organizational staff to expose their experience and to analyse it so that it can contribute to a database of useful information for the organization.

Oja and Parsons (2011:561) describe the characteristics of a management information system by its ability to:

- produce routine requested reports;
- provide useful information for managerial activities resulting in an increase in managerial efficiency; and
- provide information used in routine decisions.

### 2.4.3 MANAGEMENT INFORMATION PROCESS

Van Rensburg (2008:92) cites Brevis and De Bruyn (1995:465) with regard to the steps in the management information process as follows:

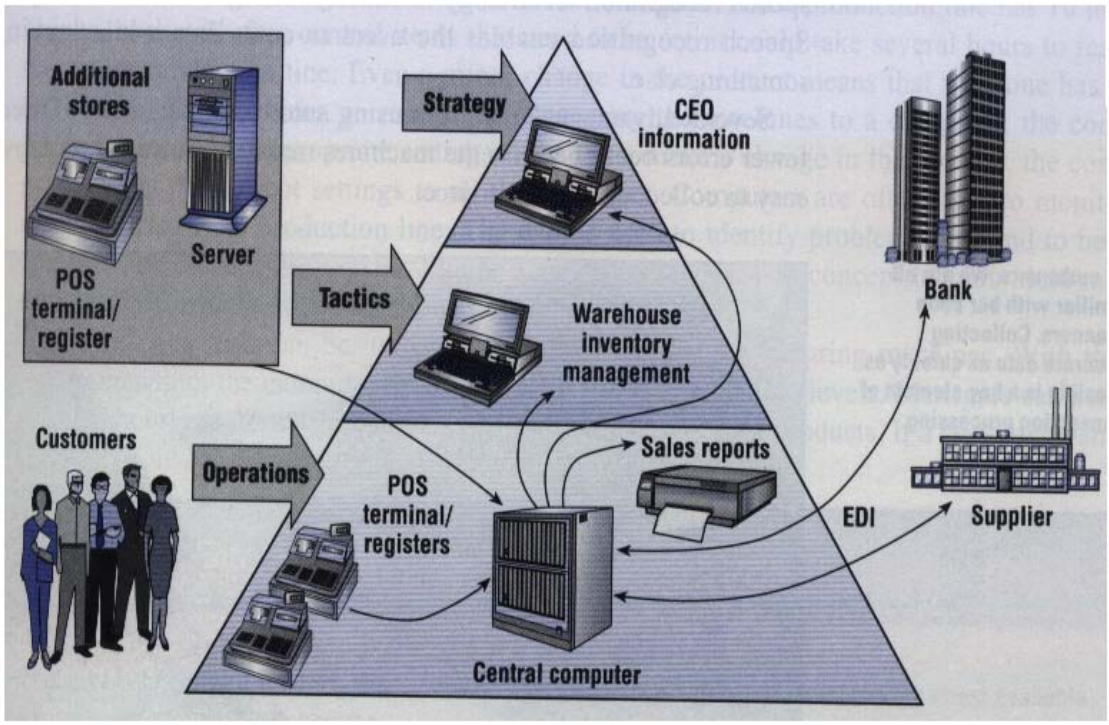
- Data collection - data is collected from external/internal business environment.
- Data classification - data items are rearranged in meaningful groups, usually alphabetical or numeric.
- Sorting of data - once data is classified, data is rearranged according to the varying needs of managers at different levels.
- Data processing - the primary data from source documents must be arithmetically processed for it to be more useful.
- Summary information **-** in this process, a great deal of information is reduced to a concise functional format.
- Information storage – information should be maintained and stored for planning and control purposes.
- Retrieval of information – managers often need to gain access to information from previous year, the requested information must be retrieved as quickly as possible to accelerate the decision making process.
- Reproduction of information – reproduction is also known as copying or duplicating.
- Communication of information – information must be understandable to and be useful for managers.

Mathew, Ma and Hargreaves (2008:1) assert that data and information management has become a cornerstone for almost all operations of an organization by providing quality, timely data for decision making and support. Past studies into data management within asset management have focused on understanding why specific systems or specific data management processes are implemented within organizations. However, there has been little investigation into the broader picture of management information systems and their overall data integration strategies.

## 2.5 DATA INTEGRITY

Riggs (2000:14) defines data integrity as the belief that data being used by the user is in its original, authorized, unmodified form. Raggad (2010:20) highlights another perspective when he asserts that data integrity aims at preventing information corruption. The corruption of data is the unauthorized modification or manipulation of information by anyone.

Figure 2.1 Flow of data captured




Source: Post, G.V. and Anderson, D.L. (2003:163). Adapted.

Figure 2.1 illustrated above by Post and Anderson (2003:163) demonstrates the importance of data integrity. Figure 2.1 shows data that is captured at operations level is used throughout the firm to make decisions. If there are problems with the data or in providing access to data, then all decisions will suffer. According to Galliers, Leidner and Baker (2000:xvi) explanation of how data integrity and security is of prime importance in ensuring validity and privacy of information. Managing information involves identifying what should be kept, how it should be organized, where it should be held and who should have access to it. The quality of management information will dictate the quality of the decisions taken and ultimately the organization's survival. Ward and Griffiths (2000:24) contend that management information systems have historically rarely directly affected top management in an organization.

According to Ward and Griffiths (2000:24) there are two main reasons for this:

- the lack of external information included in the systems; and
- the simplicity of the systems, the rawness of data, the lack of context i.e. they require knowledge, not just information.

Pearlson and Saunders (2006:196) postulate that the accuracy of information assumes real importance for society as computers dominate corporate record-keeping activities. While it is impossible to eliminate all mistakes, managers must establish controls to ensure that situations do not happen with any frequency. Post and Anderson (2003:180) contend that data integrity means keeping data accurate and correct as it is gathered and stored in the computer system. There is little value in an information system that contains obsolete or inaccurate data. The first step is to ensure that data integrity and data management lies in its accurate capture. Each item must be entered correctly and the complete information recorded. It is sometimes possible to check data as it is being entered.

The problem arises when dealing with large files with various fields. In such cases, the Valpac software should have some method to detect errors. Due to the lack of appropriate policies, many organizations suffer the consequences when managing data. Therefore, organizations need updated computer software to detect errors at the initial state. According to Ward (1995:185), one of the problems is that inefficient methods are used to capture, process, store and disseminate information. Information is used for inappropriate purposes or alternatively information which is available is not used, since it is not known or it is in the wrong place.

## 2.6 DATA INTEGRITY AND VALIDATION

Constantinou, Dekoker, Kimber, Metcalfe and Sheikh (2005:2) comment on high level principles for data integrity and validation as being able to assess the predictability of risk estimates. The above type of validation is the most difficult validation because it involves the transfer to the operational risk arena. The predictability of a 99.9% confidence level estimate cannot be tested directly against real loss outcomes.

Bose (2006:47) makes reference to the term data synchronization. It is contended that one of the reasons why organizations incur large costs for having bad data in various sections in the organization is that their data is 'out-of-sync'. This means that pieces of information related to the same things differ between the source and what is on the system. It is therefore not uncommon for the organizations to have processes that are hampered by the lack of consistent good data. The solution provided by Bose (2006:48) is data synchronization which means achieving consistent information between the source and what is on the organization's operating system.

Redman (2008:42) highlights how the easiest problem to fathom is the inaccuracy of data. Inaccuracy of data differs from organization to organization. An estimated 10 to 25% of data records contain errors or have missing data. Even a simple decision needs many data records and it could mean that a very inaccurate decision can be made on the corrupted data.

According to Ahlgren (2009:19), data integrity is vital to quality and customer satisfaction but fundamental to sound management decisions. Poor data integrity adversely affects organizational operations. Carter and Green (2009:108) argue that with inconsistent representation of data across organizational sections, as well as limited resources for data quality, this will inadvertently lead to data integrity problems.

Smith (2005:2) discusses how in a competitive business climate, dismissing the importance of data integrity is unacceptable. HEI's must ensure that the focus is on maintaining data quality. In order to achieve this, it is essential to effectively educate the team on the importance of data integrity while providing information on how this can be achieved.

## 2.7 SHOCK MANAGEMENT

Tabatoni, *et al.* (1994:9) state that an approach to managing change is the use of shock management tactics that can be implemented. Shock has its place in strategy of change only if used at an appropriate time when supporting the rhythm of change. At Durban University of Technology, this approach was used when the Faculty Officers were informed of the numerous data errors that were on the validations. The Department of Management Information was tasked to educate the Faculty Officers of the implications of the numerous errors at in-house workshops.

## 2.8 DATA OWNERS

Whitman and Mattord (2010:65) define data owners as those who are "responsible for the security and use of a particular set of information". Perry (2008:18) acknowledges data ownership as the main disadvantage to data management. Within organizations there always seems to be a dispute as to who owns the data, especially when it comes to maintenance of data. Redman (2008:77) emphasises that in order to improve accessing and improving data quality, it is imperative that management formalize the accountability or ownership of data. Some managers believe that accountability of data must lie at the point of creation. A few organizations like the Health Insurance Portability and Accountability for medical data as mentioned by Redman (2008:49) have included in their policies exactly who is responsible for the data.

Northrup (2009:26) highlighted data ownership as a big issue within the organization. She tried a method that was a co-ordinated effort to drive data quality. The main risk was the human factor and identified the “what’s in it for me” syndrome. The organization was allowed end-to end control over the data. By allowing complete control over every aspect within the organization, it enabled them to control data quality.

## 2.9 DATA/INFORMATION AS AN ASSET

Myburg (2000:8) defines information as not just combined data but that it implies understanding the relationship of the data. The definition for information assets as highlighted in the Hawley Report, Anon (1994:5) is that information assets comprise of information that is or should be documented and that has value or potential value. Kumar and Palvia (2001:154) also confirm that data plays a vital role in organizations and in recent years, companies recognize corporate data as an organizational asset.

The definition provided is quite controversial regarding data and information. Repo (1986:377) states that data is not equal to information since information is human data that must be interpreted by humans before it is useful as information. Davenport (1993) asks the question: Is the potential value of information asset a reliable indicator for its actual value? The Hawley Report (1994:9-10) highlighted in their list of information, assets that were commonly identified in their investigation namely; market and customer information, management information, specialist knowledge and information for operating in a particular area, business process information and accounting information Anon, (1994:9-10). All the above assets information may have attributes that impact on the effectiveness of an organization.

Geiger (2009:36), Marco and Smith (2006:17) both specify that a data steward should have technical and interpersonal skills to order to manage organizational data as an enterprise asset ensuring that it is used to its full capacity. According to Poirier (1990:266), information can be used again and again for many different purposes. Information may become out of date but never obsolete. However, the possibility of new use always remains, for example, libraries always retain old editions. Orna (1996:24) believes that the way information flows within an organization can have a significant impact on its communication channels. If information does not flow freely then there may be gaps or duplication and this could impede an organization's ability to communicate.

Oppenheim, Stenson and Wilson (2001:463) argue that information assets can be used to enhance organizational effectiveness by focusing on gaining benefits. This will increase the potential of information assets to be recognized and ultimately exploited, thereby creating a platform that can be used to manage and monitor information assets. Redman (2008:1) stipulates that managers have now realized that the future of their organizations depend on data and information. Thus, data and information are now treated as strategic assets. Reed (2006:50) states that organizations need to have at least one person maintaining data standards. The impact of data on the directors' ability to manage effectively has been immensely misunderstood. Data practitioners are now getting the opportunity to prove what they are capable of doing. These new duties of understanding data under the right quality and quantity can be found in the job title of the data steward.

Enfield (2010:128) argues that as much as most organizations are starting to consider data as a real asset, security over access and data editing needs to be properly controlled and monitored. Smith (2005:1) states that the organization's data is regarded as a valuable asset. Where this data is unreliable, customers, vendors, management and anyone who has a vested interest in the organization will question its credibility.

## 2.10 ISSUES REGARDING DATA MANAGEMENT

Myburg (2000:7) defines data as a building block of information, which when found in large numbers equates to knowledge. The following sections discuss in detail issues relating to data.

### 2.10.1 OMITTING DATA

Hintikka (2005:172) views a decision to omit (or not to omit) data as a strategic decision. This does not mean that the purpose of omitting data is not often deceitful but it may imply that it be viewed as a serious crime. Hintikka (2005:174) emphasizes that the entire issue of data omission has to be reconsidered and not encouraged. Hintakka (2005:174) warns that omitting data could make it difficult to judge the level of justification as well as it could be quite misleading.

Brown and Kros (2003:611) highlight that missing or inconsistent data has been a pervasive problem in data analysis since the origin of data collection. More historical data is being collected today due to the capabilities of computer software and the high capacity of storage media. The management of missing data in organizations has recently been addressed as more organizations implement large scale enterprise resource planning systems. Brown and Kros (2003:614) recommend the following methods for addressing missing data:

- Use of complete data only.
- Deleting selected cases of variables.
- Data imputation.
- Model-based approaches.

These categories are based on the randomness of the missing data and how the missing data is estimated and used for replacement.

### 2.10.2 DATA QUALITY

Marchetti, Mecella, Scannapieco and Virgillito (2006:301) and Huh, Keller, Redman and Watkins (1990:560) indicate that in order for data to be of good quality, it is measured in terms of many dimensions or characteristics, including accuracy, completeness, consistency and currency of electronic data. The above definition is seconded by Bose (2006:47). Tee, Bowen, Doyle and Rohde (2007:337) attest about dimensions of data quality that are commonly used like accuracy, completeness, consistency and timeliness. These dimensions are used from the perspective of the end-users of data and they include interpretability, availability and accessibility. These aspects have to be present to support the varied decision processes.

Loshin (2005:4) postulates that assessing data impacts associated with organizations implies understanding their information needs and the corresponding data quality expectations. According to Loshin (2005:4), in order to determine the impact there are a few probing questions that need to be addressed, namely:

- What importance does data have in achieving the organizations' business objectives?
- What data is critical to the organizational processes?
- How confident is the organization in the accuracy of the data?
- What changes to the data can improve the organization's process performance?
- In which aspects of data improvement should the organizations be investing, and in what time frame?

Marchetti, *et al*. (2006:297) emphasize that unaudited quality can cause deterioration of data quality. If organizations exchange data without knowing their actual quality, it is possible to spread low quality data. From a data quality

perspective, there is a great opportunity for improvement of actions that can be carried out on the basis of comparisons among different sets of data. This creates the most appropriate method to reconcile data thus producing new improved data that can be circulated to interested organizations. Marchetti, *et al*. (2006:300) believe that managing data quality requires solving problems for some of the data quality problems; namely, quality-driven query answering, data quality access and data quality maintenance.

Winkler (2009:303) states that "it is essential that correcting inconsistent information and filling in missing information needs to be efficient and cost effective in order to promote statistical data editing and imputation". Winkler (2009:305) contends that effective data mining requires data to be processed in a variety of steps that include removing duplicates, performing statistical data editing and imputations. If moderate errors exist in the data, data mining may waste computational and analytic resources with little gain in knowledge.

Vinten (1994:13) refers to the data management approach in two ways. Firstly, it should be used as a measure or standard as to what managers should aim for in their own work. Secondly, it should be used as the norm to be sought throughout the organization so that senior managers constructively point out where the desired standard has not been achieved in reports being presented to decision makers. This will raise quality throughout the organization.

Nakabo-Ssewanyana (1999:2) attests that the availability of reliable and continuous statistical data is fundamental to any higher education management. University managers need to have accurate and reliable data as a basis for making rational or serious decisions. Decisions based on inaccurate and unreliable data could lead to poor management of Higher Education Institutions. Quality statistical data on higher education can be put to many uses. They can be used to examine the effects of previous decisions and to assist future decision-making.

Salmon (1999:8) confirm that seventy percent of effort ends up in assuring data quality. The cliché 'garbage in garbage out' remains true when concerning on-going maintenance. Attaining success would involve a unique blend of data management, system administration and project management. According to Solomon (2005:79) "no data is better than incorrect data" considering quality data is used to make important corporate business decisions.

Lee (2003:112) in his study on creating rules in order to solve the problem of data quality listed some of the following benefits:

- Having rules and routines are generally not problematic but not having mechanisms to record, review and assess the rules are highly problematic.
- Data quality will be effective only if data quality knowledge, problem contexts and solution mechanisms work together.

Carter and Green (2009:108) explain that the way data administration is handled has a direct impact on data quality. Krishnan, Peters, Padman and Kaplan (2005:307) state that presently there is no formalized rigorous, systematic way to assess data reliability. The only thing that organizations may have is checklists of what affects data reliability.

### 2.10.3 DETECTING DATA ERRORS

Klein, Goodhue and Davis (1997:169) mention that there is strong evidence that data items stored in organizational databases have a significant rate of errors. If undetected in use, these errors have a significant effect on business outcomes. They argue that rather than accepting poor human error detection, MIS researchers need to develop better theories of human error detection and to improve their understanding of the conditions for improving performance.

Table 2.1 Theory of error detection

| | | Behaviour | |
|---|---|---|---|
| | | Error Detected | Error Not Detected |
| Data | Error Exists | Hit | Miss |
| | Error Does Not Exists | False Alarm | Correct Rejection |

Source: Klein, B. D., Goodhue, D. L. and Davis, G. B. (1997:172). Adapted.

According to Klein, Goodhue and Davis (1997:172), Table 2.1 above illustrates a theory of error detection where there are four possible outcomes of error detection. For example, a Faculty of Accounting and Informatics clerk, is given a student record which either does or does not contain an error. The clerk capturing the record either concludes or does not conclude that the record contains an error. Thus, the actual errors can be successfully detected (hits) of missed (misses). However, when no error exists, the clerk may incorrectly conclude that there is an error (false alarm) or correctly conclude there is no error (correct rejection). The theory of error detection should give a better understanding of how situations and characteristics affect the outcomes of the above table.

Klein, Goodhue and Davis (1997:185) identified the following points to consider regarding error detection:

- Staff should be aware that it is part of their job to look for and flag suspicious data.
- Staff needs to be aware of different errors in different sources of data they use.

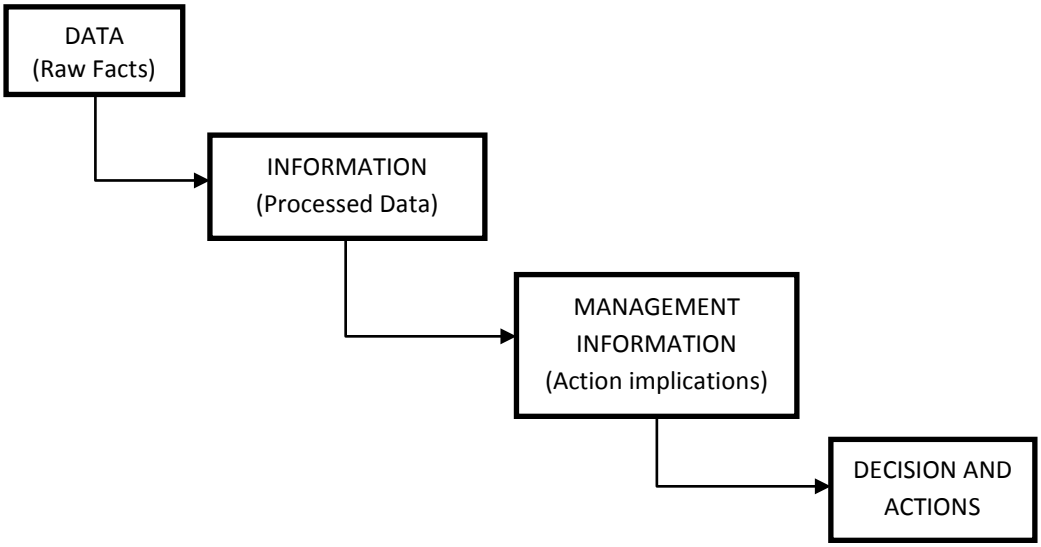
- Staff should focus on serious errors that have an important impact and not waste time on inconsequential errors.
- Staff should have some kind of incentive scheme that rewards them for finding errors.
- Some staff characteristics are better at error detection performance and these could be used as a basis for training programmes.

Errors occur in a range of activities like service encounters, accounting and even product development. In organizations, this could result in an increase in economic costs, create negative publicity, damage reputations as well as decrease customer satisfaction (Zhao and Olivera, 2006:1012).

### 2.10.4 CLEANING OF DATA

It is possible to be unaware of the amount of pollution that exists in data. It is therefore a good idea to spend time examining the data in order to determine the possibilities, although this becomes difficult with large organizations. Due to the size of large organizations, it is advisable to select random samples and analyse them to get a rough idea of the condition of data (Adriaans and Zantinge 1997:84). Most of the time, vital information is stored correctly. For instance, in a life insurance company the date of birth of clients will be correct, whereas in a bank this field will not be filled. It is safe to say that the core business of an organization is reflected in the way in which data consistency is managed.

Figure 2.2 The Relationship between data, information and management information




Source: Van Rensburg, L.R.J. (2008:87). Adapted.

Figure 2.2 illustrates the relationship between data, information and management information. According to Van Rensburg (2008:87) data refers to raw, unanalyzed facts and figures from which information can be developed and no decisions can be based on the data. Information is analysed, processed data. The transformation of data to information is called data processing. This information can diminish the uncertainty in the decision making process. Management information is information that has action implications, which implies that it is accurate, timely and relevant as well as it should represent the key features of a situation. It helps managers to determine the best course of action. Every action should also lead to the accomplishment of the organizational objectives.

Fan, Geerts, Jia and Kementsietsidis (2008:2) comment on Eckerson's (2002:1) citation that recent studies have revealed that poor quality of data within the organization's systems have incurred billions of dollars of losses. There has also been cost relating to data cleaning which is regarded as a complex labour

intensive task. It should be noted that one dilemma that seems to elude organizations is how can one assess whether the data is clean or not.

### 2.10.5 COMPONENTS OF DATA

Enfield (2010:124) categorizes data into five components of data management or integrity which include the following:

- Accuracy which is whether the data is precise enough for its intended purpose as well as whether it is represented in a similar way throughout the organization.
- Consistency refers to the data being constant or changing on a regular basis.
- Completeness whether there is sufficient data to support decision making.
- Timing refers to whether data can reach where it needs to go when the need arises.
- Security issues when it comes to changes to data and data that are audited.

### 2.10.6 DECISION MAKING LEVEL AND QUALITY OF INFORMATION

The skill of decision makers' levels and the type of decisions to be made determines the quality of information. Information provided for the strategic manager would be predictive in nature. However, this level of manager will not be concerned with timeliness or accuracy. They would prefer information to determine trends. Operational managers would need more accurate and timely information considering frequent decisions need to be taken in a timely manner (Gelinas, Sutton and Fedorowicz, 2004:145).

Evans (2008:293) states that data that can be used on a fact-driven basis for decisions to allow managers to deal with disparity in a logical fashion. The

potential offered by knowledge based systems to process raw data based on experience has made management information systems more practical. The following goals as listed by Gelinas, Sutton and Fedorowicz (2004:250) help to eliminate redundancy of data:

- Ensure input validity.
- Ensure input completeness.
- Ensure input accuracy.
- Ensure update completeness.
- Ensure update accuracy.

### 2.10.7 DATA PROCESSES

Lee and Strong (2003:17) identified three roles within a data production process, namely:

- Data collectors are those who generate information.
- Data custodians are those who manage computing resources for storage and processing.
- Data consumers are those who use the data.
- The data production process ensures effective production of high quality data that is fit for data consumers.

### 2.10.8 EVALUATION PHASE OF DATA

In order to evaluate exactly what is the state of data, it is important to go through an evaluation process. Page (2010:234) uses the following parameters as an indication of the state of organizational data:

- To determine how effective the internal controls are in eliminating errors.
- To evaluate how effective the communication process has been.

- To evaluate whether employees share knowledge and information.
- To ensure that the organization effectively trains new employees.

At the end of this evaluation phase there would be an improvement plan and opportunities that will improve the state of data.

## 2.11 FACTORS DRIVING BUSINESS TOWARDS DATA MANAGEMENT

Sabherwal and Becerra-Fernandez (2011:8) discuss four factors that appear to be driving business toward effective data management:

- Exploding data volumes

Due to technological progress and improved data storage capacities, organizations have dramatically increased the data collected and stored. Now data is collected in finer detail and over numerous years. The availability of data should mean that better decisions can be taken, but this is only possible if the managers utilize the data properly. According to Sabherwal and Becerra-Fernandez (2011:8) it becomes necessary for Managers of Higher Education Institutions to use tools to assist them with the data.

- Increasingly complicated decisions

Decision making has become more complicated because of increasing competition globally. The intricacy of internal and external processes and the availability of data volumes also contribute to the complexity of organizational decisions. It becomes necessary for decisions to be based on information obtained from structured transactional data as well as unstructured information.

- Need for quick reflexes

Due to the increasing pace of the global economy, the time available for organizations to respond to environmental changes has decreased. Thus, it

becomes imperative that managers access actionable information in order to make decisions and implement them before the opportunity is lost.

- Technological progress

Managers are expected to utilize large volumes of data, information and all factors affecting the decisions in order to make decisive decisions at an accelerated pace required in the ever changing global economy.

## 2.12 STRATEGIC TOOLS FOR DATA MANAGEMENT

Evans (2008:293) shows that just how an artist or craftsperson cannot succeed in achieving high quality services and processes without a good set of tools, so too with organizations. Some practitioners have now adapted a variety of tools from other disciplines like statistics, operations research and creative problem solving to help design, improve and control processes. These tools provide a method by which problems and issues can be viewed objectively. Goetsch and Davies (2010:352) explain that strategic tools are tools for collecting and displaying information in ways to help the human brain grasp thoughts and ideas. According to Oja and Parsons (2011:624), the best data management tool depends on several factors and it is therefore important to consider the cost, versatility and ease of use. Downey (2007:4) specifies that a strategic analytical tool is essential to ensure consistency of data. According to Downey (2007:4) certain factors should be considered when using this tool:

- The tool should be able to fulfill the goals of the organizations.
- The benefit of the tool must be well defined and actionable.
- This tool must benefit from input as well as from collaboration with people and functions with the organization.

These types of tools are generally time consuming, so it is imperative that key stakeholders are well aware of the approximate time it would take for a full analysis.

## 2.13 DATA GOVERNANCE

Data governance has numerous definitions. Newman and Logan (2006:3) define data governance as “the collection of decision rights, processes, standards, policies and technologies required to manage, maintain and exploit information as an enterprise resource”. Cohen (2006:1) defines data governance as “the process by which a company manages the quantity, consistency, usability, security and availability of data”. Thomas (2006:77) supports the above definitions by stating that “data governance really means the governance of humans and technologies that create, shape, manage, protect and display information”.

### 2.13.1 DATA GOVERNANCE AND DATA STEWARDS

Weller (2008:251) defines data governance as procedures related to the lifecycle of data within an organization. Sandler (2008:26) clarifies that data governance is synonymous with data quality considering that data governance involves data architecture which heavily influences data quality. Villar (2006:23), Geiger (2009:36) and McGilvray (2007:25) agree that the roles of data stewards are fast becoming popular in information management programmes. Data stewards are said to be responsible for definition, accuracy, consistency and timeliness of critical information within the organization.

### 2.13.2 BENEFITS OF DATA GOVERNANCE

Waddington (2010:15) identifies the following main benefits of data governance:

- Quicker decision making and improved quality.
- The ability to respond swiftly to business change.
- Better quality business intelligence reporting.
- The reduction in costs that the organizations incurred.

## 2.14 CONCLUSION

The literature review in this chapter provided a sound theoretical understanding of data management as a strategic tool highlighting different viewpoints from various authors in this field. The following chapter highlights a detailed description and explanation of the overall research design used in this study.

# CHAPTER 3

# RESEARCH METHODOLOGY AND DESIGN

## 3.1 INTRODUCTION

The previous chapter dealt with the literature review on data management as a strategic tool. It also examined the different aspects of data management in respect of management information and data integrity. Gray (2009:91) explains that when undertaking research in the researcher's own organization, it must be ensured that the researcher has a clear understanding of issues being researched. He further states that when working within an organization, it is expected that the researcher would have easy access to organizational resources.

## 3.2 RESEARCH DESIGN AND METHODOLOGY

Creswell (2009:3) highlighted that there are three types of research designs, namely, qualitative, quantitative and mixed methods. These definitions are defined as follows (Creswell, 2009:4):

- Qualitative research means exploring and understanding the meaning individuals or groups assigned to a social/ human problem. This process comprises of emerging questions and procedures, data collected within the participants locale, data analysis. The researcher then makes an interpretation of the data.
- Quantitative research means testing objective theories by examining the relationship among variables. These variables are typically on numbered instruments ensuring that data can be analysed using statistical procedures.
- The mixed method combines both the qualitative and quantitative designs as well as it involving philosophical assumptions.

## 3.3 RESEARCH METHOD

According to Leedy and Ormrod (2010:2), “research is a systematic process of collecting, analyzing and interpreting data in order to increase the understanding of a phenomenon about which we are interested”. This research study has adopted the above process. For the purpose of this study a quantitative approach was followed.

## 3.4 PRIMARY DATA

Sekaran and Bougie (2010:180) define primary data as first-hand information obtained by the researcher on variables of interest for the specific purpose of the study. The primary data to be used in this research was a structured questionnaire (Annexure D). A questionnaire as explained by Sekaran and Bougie (2010:197) is a pre-formulated list of questions in which respondents record their answers usually within defined alternatives. When the researcher knows exactly what is required and how to measure the variables of interest, a questionnaire is an efficient data collection mechanism (Sekaran and Bougie, 2010:197).

## 3.5 SECONDARY DATA

Sekaran and Bougie (2010:184) define secondary data as information gathered by someone other than the researcher conducting the study. Such data can be internal or external to the organization and accessed through the internet or perusal of recorded or published information. There are several sources of secondary data used in this study, namely:

- Text Books, Journal articles.
- Periodicals.
- Government publications.
- Census data.

- Statistical abstracts, Internet sources.

## 3.6 TARGET POPULATION

Collis and Hussey (2003:66) contend that when the total population is small, it is normal to include each member of the population. Likewise, if the total population is too large then it would be too time-consuming and expensive to collect data. Thus, only a sample of the whole population could be selected.

This study will use the survey method which is a technique to include all elements. The target population included all Heads of Department in the 47 Academic departments, all 6 Deans from all the Faculties, Registrar, Faculty Officers and staff in the Faculty, Information Technology Support Services staff, Management Information staff, Human Resource Managers and staff at the Academic Structure division. This equated to 174 target respondents. Since this research was confined to the Durban University of Technology, it was essential that all Academic departments across all Faculties were used in the survey. The list of the respondents was accessed from the Human Resources sub-system on the ITS database Department. The entire population was included using the survey method. It thus eliminated the need to select a sample using any sampling technique.

## 3.7 USE OF THE SURVEY METHOD

Dane (2011:218) suggests that survey methods are undoubtedly the oldest method used by the researchers and they are the methods for a small scale study with which the general public is most familiar. This method involves obtaining information directly from the target population identified. For this study, there was no need to use any sampling techniques as the target population was too small and only equated to 174 respondents.

Dane (2011:220) asserts further that there are three types of information that may be obtained from the survey method:

- A fact which is a phenomenon or characteristic available to anyone who knows how to observe it.
- An opinion which is an expression of a respondent's preference, feeling or behavioral intention.
- Behaviour refers to an action completed by a respondent.

Gray (2009:220) makes reference to the two broad categories that surveys fall into. Descriptive surveys are designed to measure the characteristics of a particular population either at a fixed point in time or comparatively over time. This study is therefore descriptive in nature.

## 3.8 MEASURING INSTRUMENT

A questionnaire is one of the most widely used data collection technique. Many authors like Bell (2005) and Oppenheim (2000) as cited by Saunders, Lewis and Thornhill (2007:355) argue that it is not so easy to produce a good questionnaire. It must collect the precise data that is required in order to achieve the objectives of the research. Ghauri, *et al.* (1995:41) argue that the quality of information depends considerably on the measurement procedures used in the gathering of data. The research instrument to be used in the collection of the primary data would be a structured questionnaire. In addition, a letter of informed consent was obtained from the Research Director prior to conducting the empirical investigation at the Durban University of Technology as it was an in-house investigation.

The questionnaire was designed to be quick and easy to complete. The questions involved a choice of tick boxes. The questionnaire was confidential and anonymity was promised and respected. The questionnaire used the Likert

Scale as described by Cameron and Price (2009:349). Likert scales provide researchers with a range of responses from which they can choose. Cameron and Price (2009:350) attest that the Likert scale should have odd number of response categories for all for a neutral reply, and should be used intermittently to prevent central tendency bias from distorting the data.

## 3.9 ADVANTAGES AND DISADVANTAGES OF QUESTIONNAIRES

According to Sekaran and Bougie (2010:212) questionnaires have both strengths and weaknesses and they highlight the advantages and disadvantages of a structured questionnaire, namely:

### 3.9.1 Advantages

- Anonymity is guaranteed.
- A wide geographic region can be reached.
- Token gifts can be enclosed to seek compliance.
- Respondent can take more time to respond at their own convenience.

### 3.9.2 Disadvantages

- Response rate is generally low, it if is mailed to respondents.
- Respondents cannot clarify questions that may be confusing.
- Follow-up procedures for non-responses are necessary.

## 3.10 VALIDITY AND RELIABILITY OF THE MEASURING INSTRUMENT

Gray (2009:155) mentions that designing a research instrument must be internally valid and reliable. In order to achieve this, the instrument must be designed in a way that generalization can be made from the analysis of the data to the population. Leedy and Ormrod (2010:28) highlight validity as the extent to which the research instrument measures what it is supposed to measure.

Gray (2009:158) and Sekaran (2003:203) both agree that in order for a research tool to be reliable it would have to give the same results when something was measured across time. The two most important aspects of precision are reliability and validity. Reliability is computed by taking several measurements on the same subjects. The questionnaires contained instructions for each question in order to increase the respondent's ability to answer the questionnaire.

## 3.11 PILOT STUDY

Bayat and Fox (2000:102) state that the pilot study is a trial run done on a small scale. Gray (2009:227) emphasizes that it is likely to have several drafts of the research tool to be tested in order to reach a satisfactory final version. The pilot study determines whether the research instrument is adequately designed. Questionnaires were randomly given to 6 Heads of Department, 2 Faculty Officers, 2 staff from the Information Technology Support Services and 1 member of staff in the Management Information Department.

Prior to the empirical study, a pilot study was conducted with a random homogenous group of 11 respondents. In order to assess the reliability of the measuring instrument the questionnaire, it was important to conduct the Cronbach's Alpha test. Muijs (2011:221) concurs that a reliability co-efficient of 0.70 or higher is considered as acceptable. The various categories were tested for reliability scores. This result highlighted that the measuring instrument was highly reliable in order to make concrete recommendations pertaining to this study. The Cronbach's Alpha test revealed a value of 0.658, which indicated that the questionnaire was reliable. The pilot study proved valuable as a few amendments had to be made. The research instrument was pre-coded so it would be easier for capturing data for analysis.

## 3.12 DATA COLLECTION METHODS

Sekaran (2003:223) outlines the following advantages and disadvantages of the different data collection methods as shown in Table 3.1.

Table 3.1 Data Collection Methods

| **Mode of Data Collection** | **Advantages** | **Disadvantages** |
|---|---|---|
| **Personal or Face-to-Face Interviews** | • Can establish rapport and motivate respondents.<br>• Can clarify the questions, clear doubts, add new questions.<br>• Can use visual aids to clarify points.<br>• Can read nonverbal cues. | • Takes personal time<br>• Costs more when a wide geographic region is covered.<br>• Respondents may be concerned about confidentiality of information given.<br>• Interviewers need to be trained.<br>• Can introduce interviewer biases. |
| **Personally Administered Questionnaires** | • Can establish rapport and motivate respondents<br>• Doubts can be clarified<br>• Less expensive when administered in groups<br>• Almost 100% response rate ensured | • Organizations may be reluctant to give up company time for the survey with groups of employees assembled |
| **Electronic Questionnaires** | • Easy to administer<br>• Can reach globally<br>• Very inexpensive<br>• Fast delivery | • Computer literacy is a must<br>• Respondents must have access to the facility<br>• Respondent must be willing to complete the survey |

Source: Sekaran, U. (2003:223). Adapted.

## 3.13 DATA COLLECTION PROCEDURE

According to Creswell (2009:178) the personal method as depicted in Table 3.1 elicits a high response rate compared to other data collection methods. For the purposes of this study the precoded questionnaires were personally administered to all the respondents in the survey.

## 3.14 ADMINISTRATION OF THE QUESTIONNAIRE

In this study the personal method of administering the questionnaire was used as a data collection tool. A high response rate of 74% was obtained using this method.

## 3.15 ELIMINATION OF BIAS

Mitchell and Jolley (2010:308) suggest that selection bias should be avoided. Firstly prevent self-selection of participants. By avoiding self-selection the researcher is left with groups that differ in at least one way and they are inclined to answer in a similar way. In this research, however, the researcher was undertaking a survey so all respondents were considered, thereby eliminating the need for self-selection or selecting a sample.

## 3.16 FORMULATION OF HYPOTHESES

Several hypotheses were formulated in order to statistically evaluate the level of significance and to interpret the key results of the findings.

## 3.17 ANALYSIS OF THE DATA

The questionnaires were collected and counted to ensure that all respondents had answered and completed the questions. The questionnaires were pre-

coded, so the first step was to capture data of all completed questionnaires on the computer to form a data set. A number of analyses were conducted in the form of frequencies and percentages. The preliminary analysis was conducted using Microsoft Excel. Data from the questionnaires were analysed by a statistician using SPSS (Statistical Package for the Social Sciences) version 16 for windows and Predictive Analytic Software (PASW) version 18.0.

Sekaran and Bougie (2010:26) describe data analysis as data that is statistically analyzed in order to determine whether the generated hypotheses have been supported. Dane (2011:237) concurs with the above statement by stating that the data analysis is dependent on the research hypothesis and the types of measurement scales used. The analysis was further broken down into descriptive statistics whereby frequencies and inferential statistics were used to test the hypotheses formulated. The relationship between the analysis of the data as well as their significance was also computed.

## 3.18 DELIMITATIONS OF THE EMPIRICAL STUDY

Robson (2002) as cited by Saunders, *et al.* (2007:149) lists limitations such as subject or participant error and subject or participant bias. The findings of this research cannot be generalised to other higher institutions in KwaZulu-Natal or South Africa because of institutional factors and other variables peculiar to the Durban University of Technology. However, it is contended that the findings could be useful for other scholars undertaking a similar study.

## 3.19 CONCLUSION

This chapter discussed the research methodology that was used in terms of the research design, the target population and data collection methods. The next chapter will be dedicated to the analysis of the results and the discussion of the findings.

# CHAPTER 4

# ANALYSIS OF RESULTS AND DISCUSSION OF FINDINGS

## 4.1 INTRODUCTION

This chapter presents the analysis of the results and discusses the findings. The data collected from the responses was analysed with Predictive Analytic Software (PASW) version 18.0 and SPSS (Statistical Package for the Social Sciences) version 16 for windows. The initial results were presented in the form of graphs and cross tabulations. A total of 174 questionnaires were distributed to the target respondents. The number of returned questionnaires totaled 128 which represented a high response rate of 74%. The data was captured by the researcher from the pre-coded questionnaires returned.

## 4.2 RELIABILITY OF THE ITEMS IN THE MEASURING INSTRUMENT

Muijs (2011:217) states that reliability refers to the property of a measurement instrument that gives similar results for similar inputs. Cronbach's alpha is a measure of reliability. Treiman (2009:245) explains how reliability is defined as the proportion of the variability in the responses to the survey that is the result of differences in the respondents. The computation of Cronbach's alpha was based on the number of items on the survey (k) and the ratio of the average inter-item covariance to the average item variance.

$$\alpha = \frac{\mathrm{k(cov/var)}}{1 + (\mathrm{k} - 1)\ (\mathrm{cov/var})}$$

The item variances are all equal, this ratio simplifies to the average inter-item correlation and the result is known as the Standardized item alpha (or Spearman-Brown stepped-up reliability coefficient).

$$\alpha = \frac{\mathrm{kr}}{1 + (\mathrm{k} - 1)\ \mathrm{r}}$$

The coefficient of 0.921 reported for these items is an estimate of the true alpha, which in turn is a lower bound for the true reliability.

## 4.3 RESPONSE RATE

Table 4.1 Response rate from staff by departments

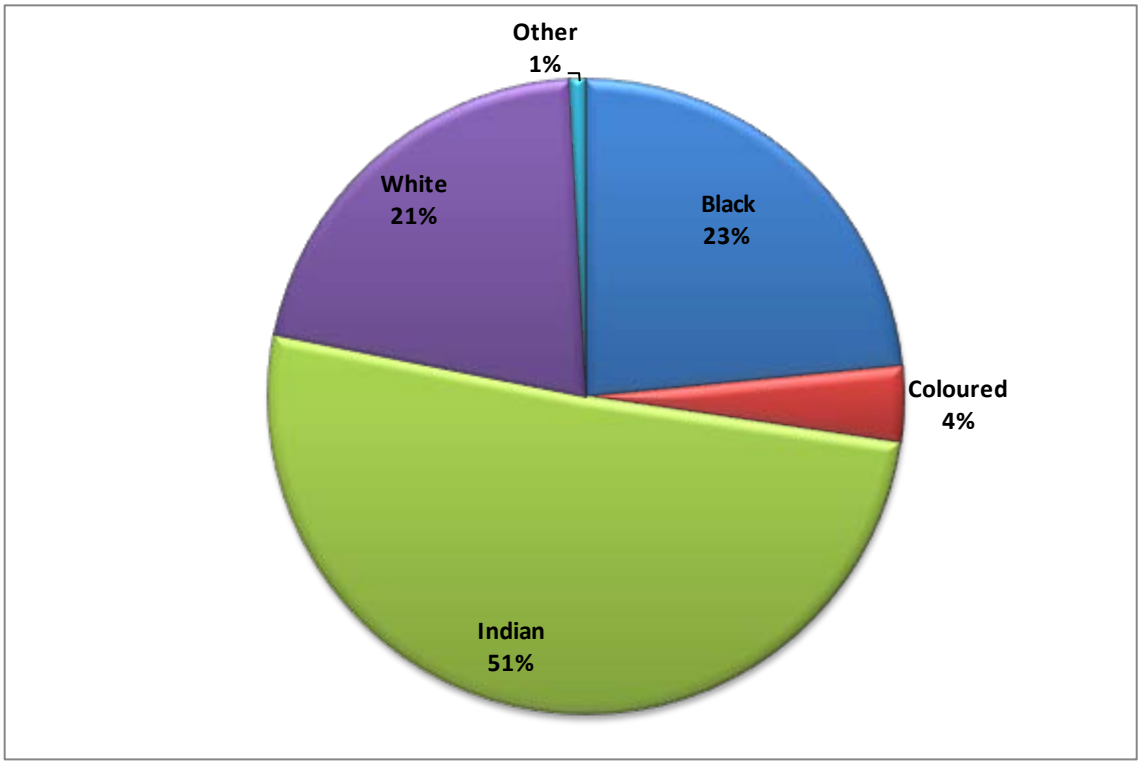
| Department | Questionnaires Distributed | Questionnaires Received | Overall % Received |
|---|---|---|---|
| Academic Data and Student Records | 11 | 7 | 64% |
| Centre for Quality Promotion and Assurance | 9 | 7 | 78% |
| Examinations | 5 | 3 | 60% |
| Executive/ Deputy Dean | 11 | 7 | 64% |
| Faculty staff | 19 | 13 | 68% |
| Faculty Officers | 6 | 4 | 67% |
| Head of Department | 49 | 37 | 76% |
| Research Management and Development | 10 | 5 | 50% |
| Senior Human Resources Officer | 19 | 12 | 63% |
| ITSS | 31 | 29 | 94% |
| Management Information | 4 | 4 | 100% |
| **Total** | **174** | **128** | 74% |

The questionnaires were distributed to the above departments (Table 4.1) at the Durban University of Technology. The total number of respondents that completed the questionnaire was 128. Table 4.1 illustrates the detailed list of the responses received from various respondents. Sekaran and Bougie (2010:212) state that questionnaires that are personally administered could result in almost 100% response rate. The questionnaires were personally administered, thus equating to a highly significant response rate of 74%. The high response rate using the personal method can also be attributed to the general remarks made by Muijs (2011:37) that the questionnaires that were short and to the point elicited excellent response rates. Hence, there was no need for the researcher to incur any cost, as there were follow-up phone calls and e-mails also which helped as a reminder to those who had not responded.

## 4.4 BIOGRAPHICAL ANALYSIS OF RESULTS

### 4.4.1 RACE DISTRIBUTION

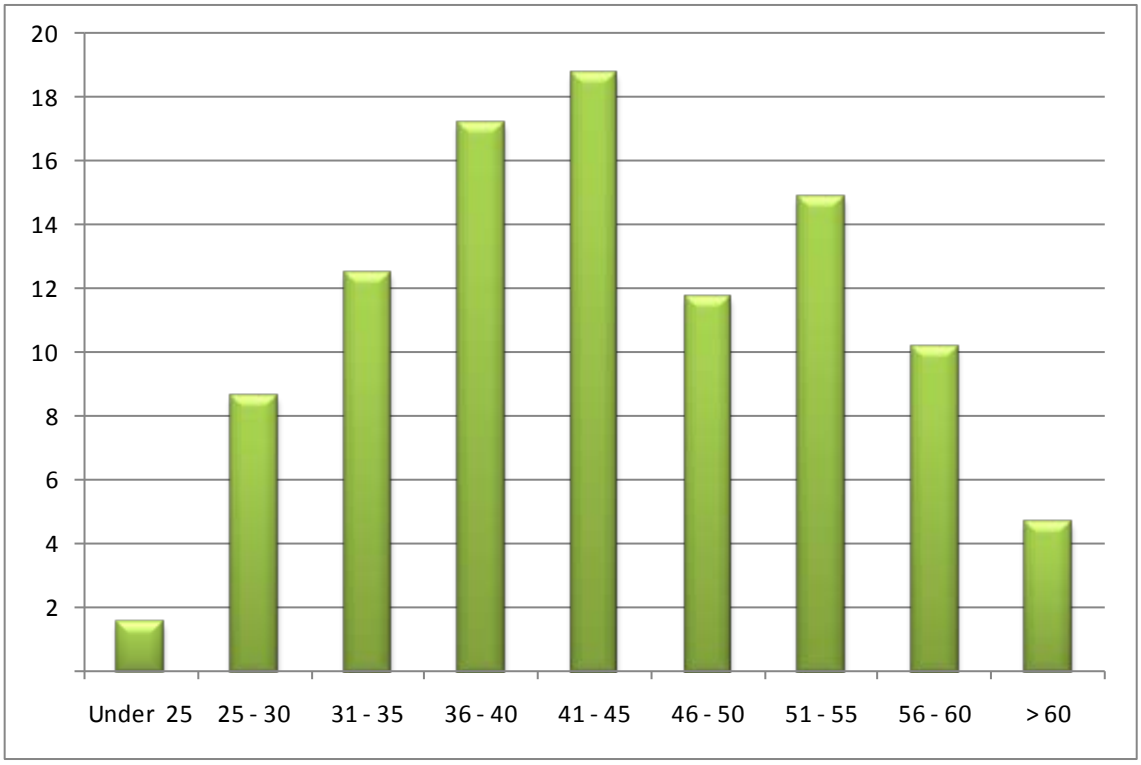
Figure 4.1 The race distribution of respondents (n = 128)




The pie chart in Figure 4.1 illustrates the percentage race distribution of the repondents in this study. The majority of the responses were from Indian respondents equaling 51% with 23% from Black respondents, 21% from White respondents 4% and 1% from Coloured and other respectively.

### 4.4.2 AGE CATEGORIES

Figure 4.2 The percentages of respondents by age (n =128)




The stacked bar in Figure 4.2 illustrates the respondents' ages which ranged from under 25 to older than 60 years of age. The majority of the respondents were between the ages of 41 to 45 years of age. Figure 4.2 indicates that respondents under 25 constituted a small portion of the responses.

### 4.4.3 SECTOR DISTRIBUTION

Figure 4.3 The percentage of respondents by sector (n = 128)

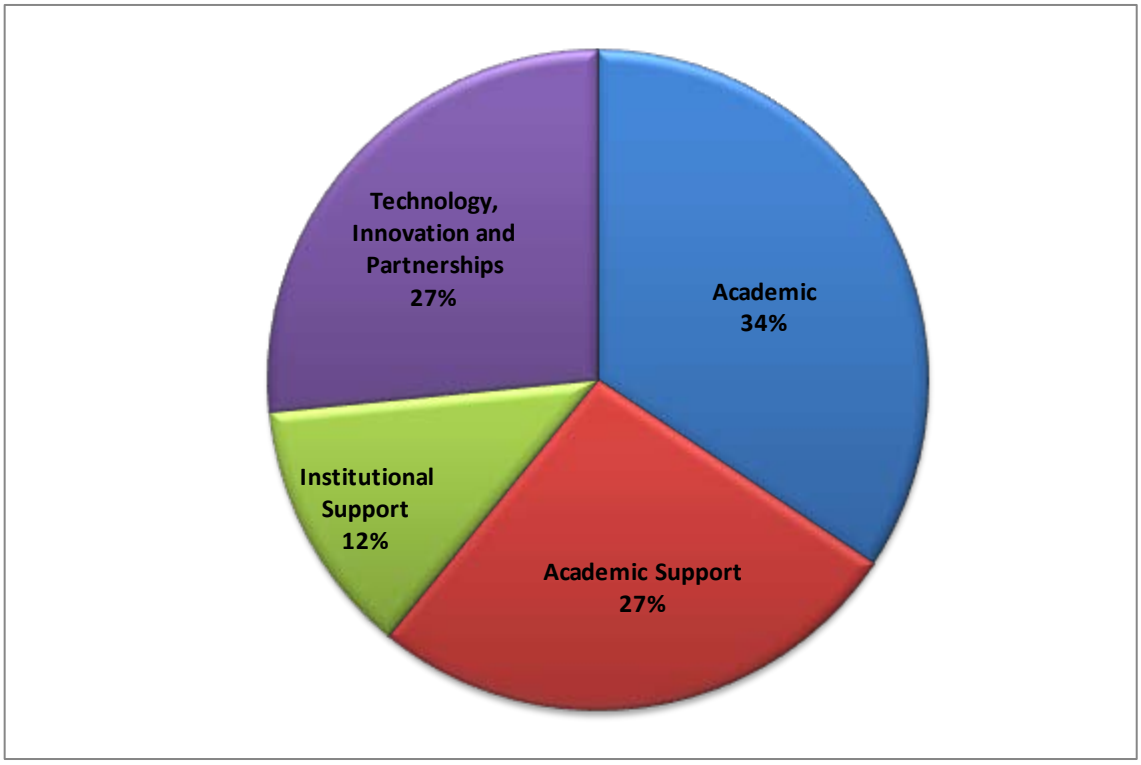



Figure 4.3 reveals the respondents in their relevant sectors. The pie chart in Figure 4.3 shows that the majority of the respondents (34%) were from the academic sector, while the least of the respondents (13%) were from the institutional support sector. The above distribution was expected considering that most departments selected fell in the academic sector (27%) and there were only 2 departments (12%) that were in the institutional support sector. The technology, innovation and partnerships sector distribution also equated to 27%.

### 4.4.4 RESPONDENTS DISTRIBUTION BY DEPARTMENTS

Figure 4.4 The percentage of respondents by departments (n = 128)

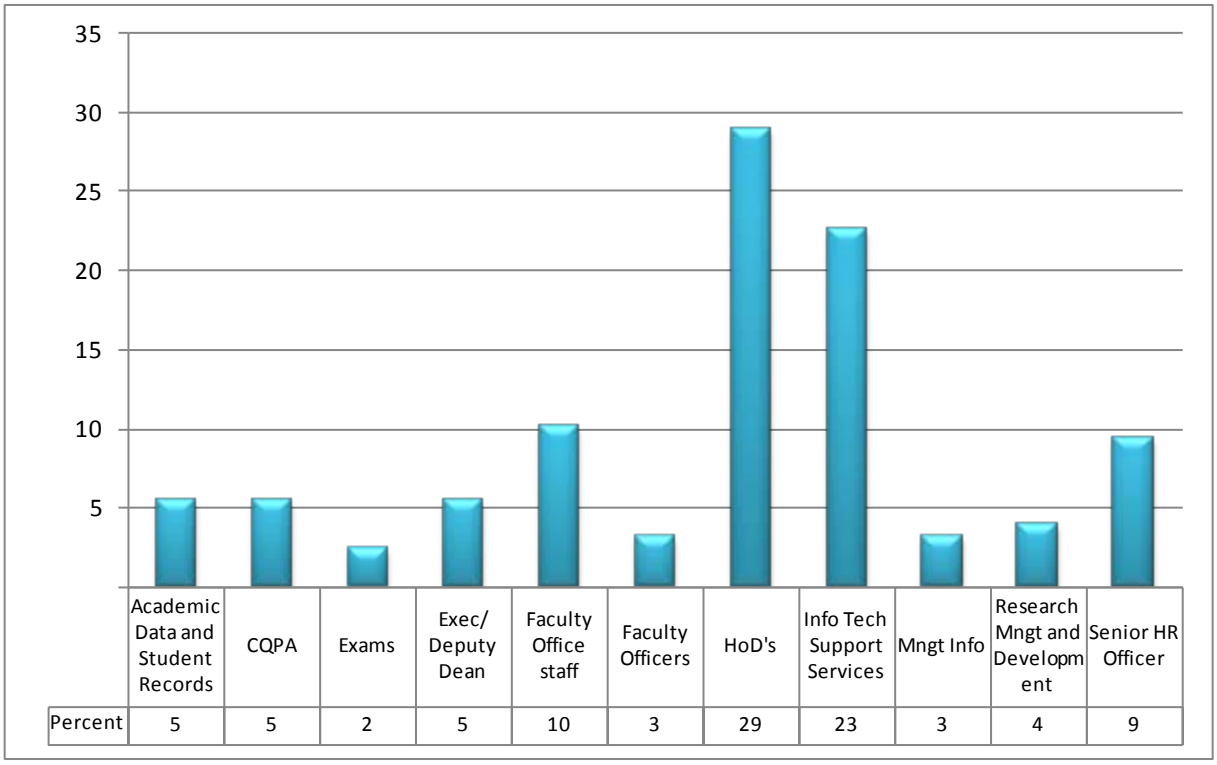



Figure 4.4 illustrates the percentage of respondents in their respective departments. A moderate number of the respondents of 29% and 23% were Academic Head's of Departments and the Information Technology Support Services department respectively. The least of the respondents were from the Examination department (2%), Faculty officers (3%) and Management Information (3%). This percentage can be attributed to the small number of the respondents in the above departments.

## 4.5 DESCRIPTIVE STATISTICS

Treiman (2009:114) states that presenting descriptive statistics are very informative as it allows the reader to understand the most basic aspects of the data being analysed. Salkind (2010:8) states that descriptive statistics is used to organize and describe the characteristics of a collection of data. McMillian and Schumacher (2008:150) concur that the use of descriptive statistics is a fundamental way to summarise data, and it is indispensable in the interpretation of the results of the analysis. This section presented the descriptive statistics based on the demographic information of the study. It is presented using tables, cross-tabulations and various types of statistical tests employed to yield a statistical value. Bryman and Cramer (2009:199) describe cross-tabulations as one of the simplest and most frequently used ways of demonstrating the presence or absence of a relationship. The analysis below indicates the scoring patterns of the respondents for the variables that constituted the different categories of the measuring instrument that was personally administered to the respondents.

## 4.6 FREQUENCIES

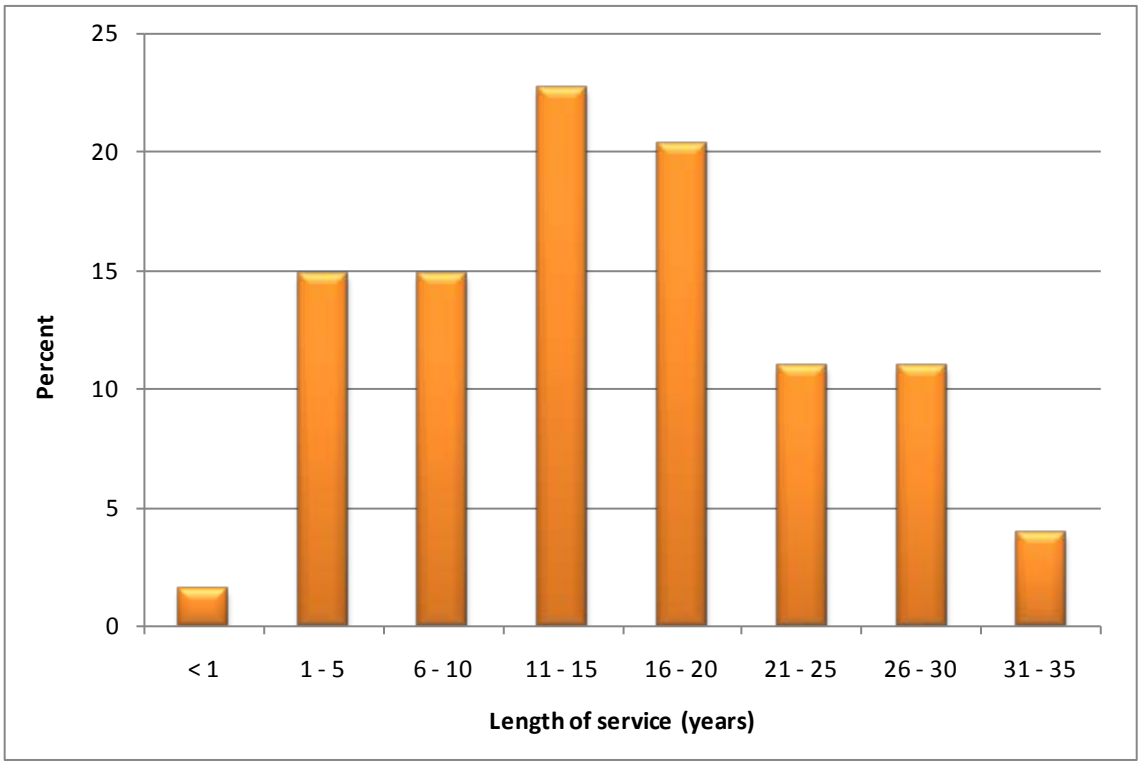
Frequencies are used to determine how often a respondent made a certain selection to a dataset. McMillan and Schumacher (2006:153) explain frequency to be the number of times the same score was attained, while Sekaran and Bougie (2010:313) refer to frequencies as the number of times various sub-categories of a certain phenomenon occur. The percentage can then be easily calculated from the frequencies.

Table 4.2 Summary of respondents by race and age (n = 128)

| | | Race | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | **Black** | **Coloured** | **Indian** | **White** | **Other** | |
| Under 25 | Count | 2 | 0 | 0 | 0 | 0 | 2 |
| | % of Total | 1.6% | 0.0% | 0.0% | 0.0% | 0.0% | 1.6% |
| 25 - 30 | Count | 6 | 0 | 5 | 0 | 0 | 11 |
| | % of Total | 4.7% | 0.0% | 3.9% | 0.0% | 0.0% | 8.6% |
| 31 - 35 | Count | 11 | 2 | 3 | 0 | 0 | 16 |
| | % of Total | 8.6% | 1.6% | 2.3% | 0.0% | 0.0% | 12.5% |
| 36 - 40 | Count | 4 | 1 | 15 | 2 | 0 | 22 |
| | % of Total | 3.1% | 0.8% | 11.7% | 1.6% | 0.0% | 17.2% |
| 41 - 45 | Count | 4 | 1 | 13 | 6 | 0 | 24 |
| | % of Total | 3.1% | 0.8% | 10.2% | 4.7% | 0.0% | 18.8% |
| 46 - 50 | Count | 2 | 0 | 11 | 2 | 0 | 15 |
| | % of Total | 1.6% | 0.0% | 8.6% | 1.6% | 0.0% | 11.7% |
| 51 - 55 | Count | 1 | 0 | 11 | 6 | 1 | 19 |
| | % of Total | 0.8% | 0.0% | 8.6% | 4.7% | 0.8% | 14.8% |
| 56 - 60 | Count | 0 | 1 | 4 | 8 | 0 | 13 |
| | % of Total | 0.0% | 0.8% | 3.1% | 6.3% | 0.0% | 10.2% |
| > 60 | Count | 0 | 0 | 3 | 3 | 0 | 6 |
| | % of Total | 0.0% | 0.0% | 2.3% | 2.3% | 0.0% | 4.7% |
| Total | Count | 30 | 5 | 65 | 27 | 1 | 128 |
| | % of Total | 23.4% | 3.9% | 50.8% | 21.1% | 0.8% | 100.0% |

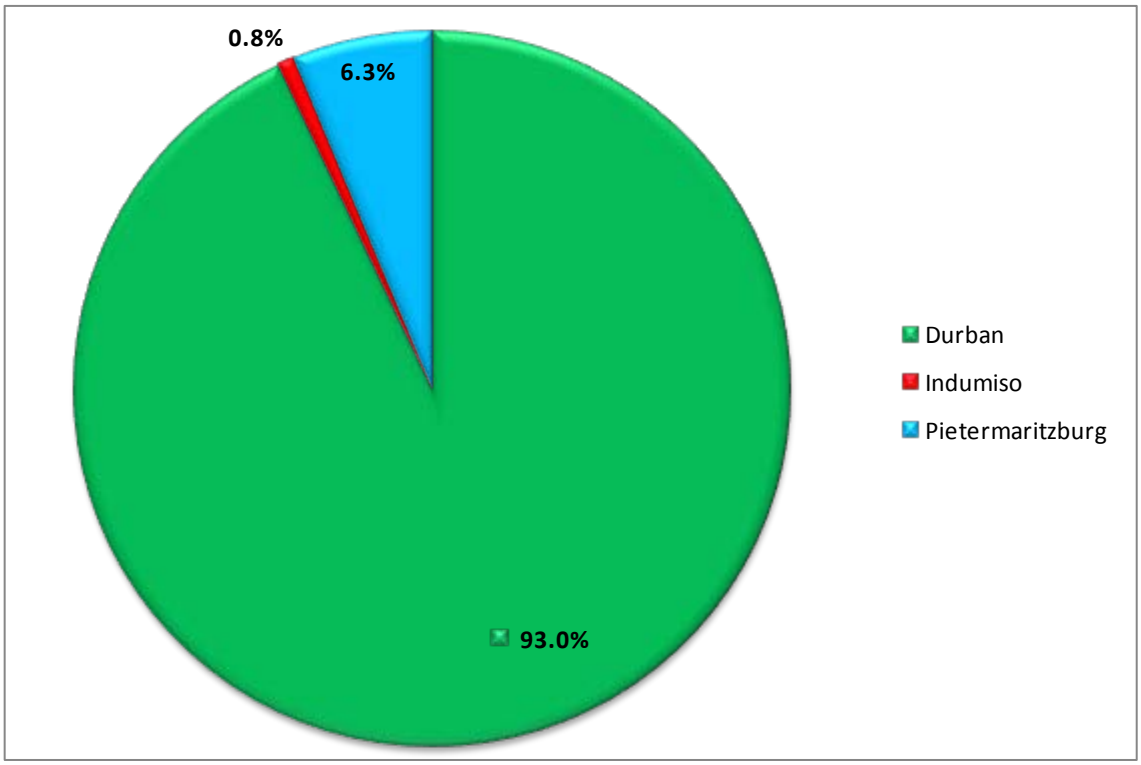
Table 4.2 indicates that almost half of the target respondents in the survey were (50.8%) Indian, with Black and White respondents constituting similar percentages. The lowest response was from the Coloured race group (3.9%). This population is in proportion of the current staff compliment of the selected departments at the Durban University of Technology. Table 4.2 also reveals that the majority of the respondents (93.7%) were between 25 and 60 years of age while the minor age category of respondents comprised of only 1.6%. Table 4.2 also illustrates that the majority of respondents fell between the 41 and 45 years of age category (18.8%).

Figure 4.5 The percentage of respondents by length of service (n = 128)




The pattern as illustrated in Figure 4.5 above is somewhat normalised with 43% of the respondents having worked for the Institution between 11 to 20 years. It is contended that 43% could be attributed to the fact that the respondents may have been familiar with the systems regarding data management/data integrity.

Figure 4.6 The percentage of respondents by campus (n = 128)




Most of the respondents (93%) were from the Durban campus as illustrated in the pie graph in the Figure 4.6 above. This was expected as most of respondents were in Durban Campus. A marginal 6.3% of the respondents were on different sites of the Durban University of Technology; namely, Indumiso and Pietermaritzburg campuses respectively.

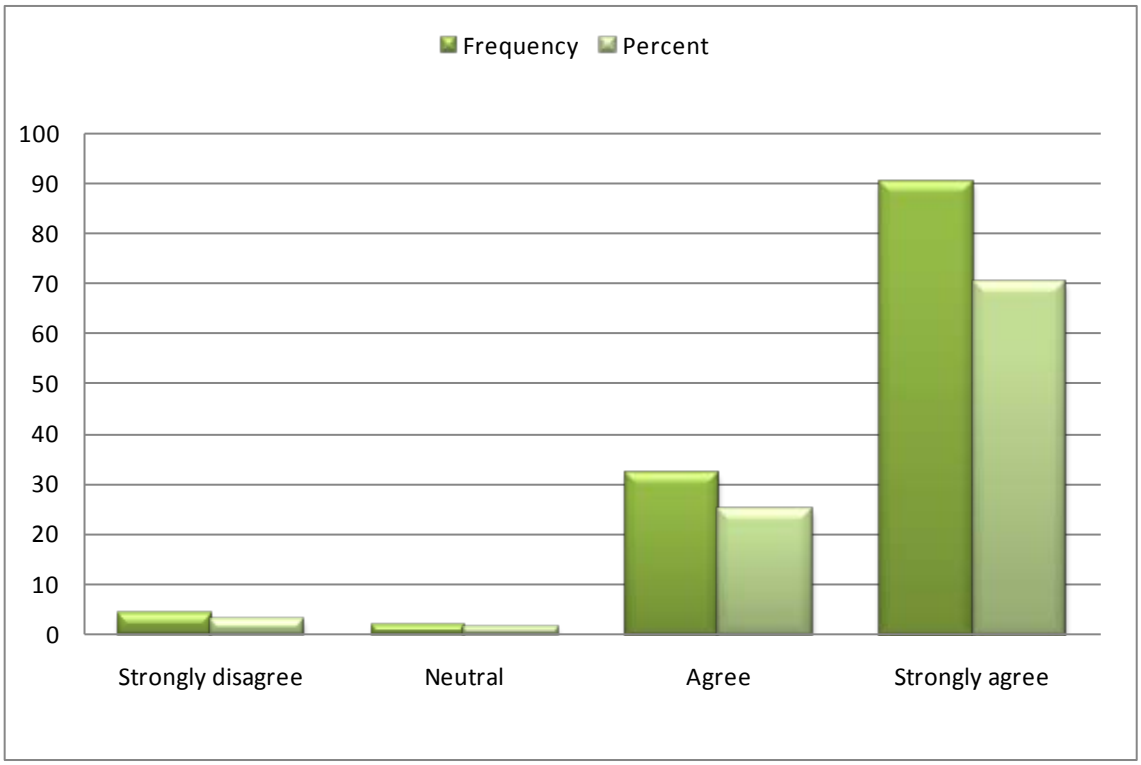
Table 4.3 Cross-tabulation by sector and department (n = 128)

| | | Sector | | | | Total |
|---|---|---|---|---|---|---|
| | | Academic | Academic Support | Institutional Support | Technology, Innovation and Partnerships | |
| Academic Data and Student Records | Count | 0 | 7 | 0 | 0 | 7 |
| | % of Total | .0% | 5.5% | .0% | .0% | 5.5% |
| Centre for Quality Promotion and Assurance | Count | 0 | 7 | 0 | 0 | 7 |
| | % of Total | .0% | 5.5% | .0% | .0% | 5.5% |
| Examinations | Count | 0 | 3 | 0 | 0 | 3 |
| | % of Total | .0% | 2.3% | .0% | .0% | 2.3% |
| Executive/ Deputy Dean | Count | 7 | 0 | 0 | 0 | 7 |
| | % of Total | 5.5% | .0% | .0% | .0% | 5.5% |
| Faculty Office staff | Count | 0 | 13 | 0 | 0 | 13 |
| | % of Total | .0% | 10.2% | .0% | .0% | 10.2% |
| Faculty Officers | Count | 0 | 4 | 0 | 0 | 4 |
| | % of Total | .0% | 3.1% | .0% | .0% | 3.1% |
| Head of Department | Count | 37 | 0 | 0 | 0 | 37 |
| | % of Total | 28.9% | .0% | .0% | .0% | 28.9% |
| Information Technology Support Services | Count | 0 | 0 | 0 | 29 | 29 |
| | % of Total | .0% | .0% | .0% | 22.7% | 22.7% |
| Management Information | Count | 0 | 0 | 4 | 0 | 4 |
| | % of Total | .0% | .0% | 3.1% | .0% | 3.1% |
| Research Management and Development | Count | 0 | 0 | 0 | 5 | 5 |
| | % of Total | .0% | .0% | .0% | 3.9% | 3.9% |
| Senior Human Resources Officer | Count | 0 | 0 | 12 | 0 | 12 |
| | % of Total | .0% | .0% | 9.4% | .0% | 9.4% |
| Total | Count | 44 | 34 | 16 | 34 | 128 |
| | % of Total | 34.4% | 26.6% | 12.5% | 26.6% | 100.0% |

As reflected in the Table 4.3, respondents from the academic sector were all management staff (5.5% Deans and 28.9% being Heads of Departments). The highest categories of respondents in Table 4.3 were academics (34.4%) with Institutional Support respondents constituting the smallest grouping (12.5%).

## 4.7 DATA MANAGEMENT/ INTEGRITY

Figure 4.7 Importance of Data management and integrity (n = 128)




As illustrated in Figure 4.7, 70% of the respondents strongly agreed while 25% respondents agreed that data management and integrity is of utmost importance. In total 95% of the respondents either agree or strongly agree that data management and integrity wree important. There were merely 4 respondents (3%) who strongly disagreed that data management and integrity was of any importance. A neutral reponse was reported by 2% of respondents in Figure 4.7. It would appear therefore that the majority of the respondents for this study consider data management and integrity as being of utmost importance. Coombs (2003:1) states that data integrity is an important feature of nearly every computer system. It is important to guard against threats that impact on data integrity in order to ensure that data can be deemed to be accurate solely on its presence in a system.

Figure 4.8 Data quality checks at source of capturing (n = 128)

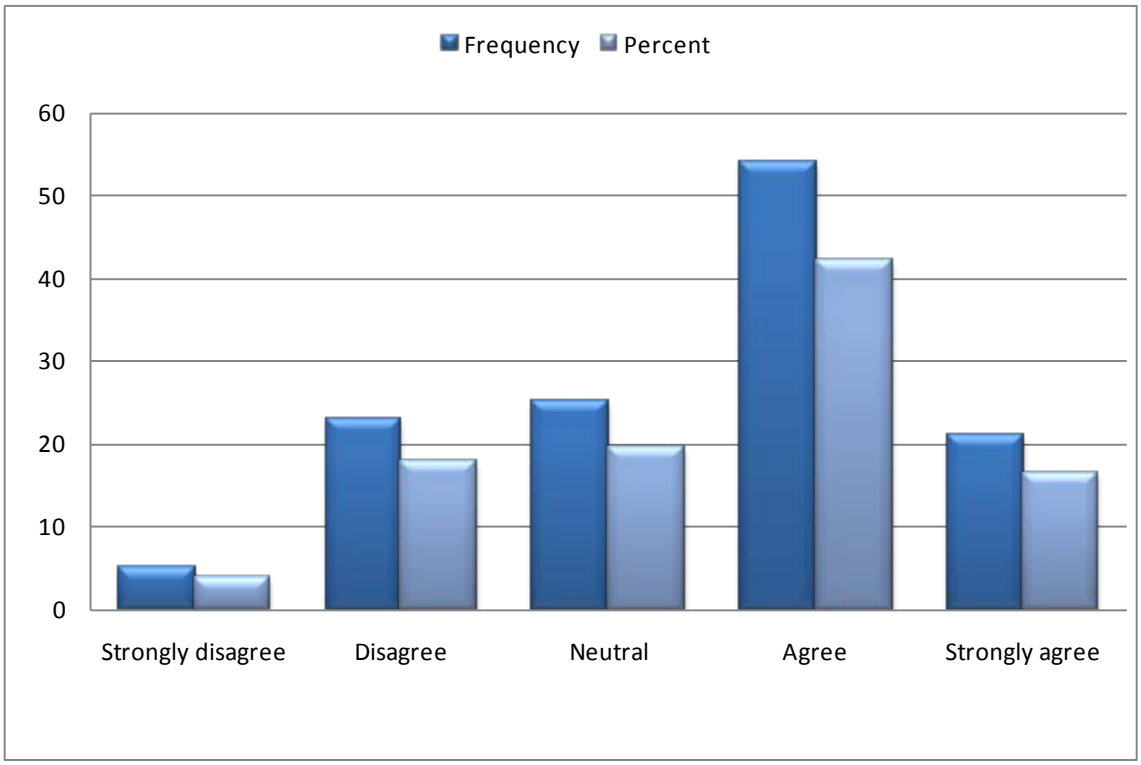



Figure 4.8 reveals that majority of the respondents (42%) agreed and 16% strongly agreed that data quality checks exist currently at the source of capturing to ensure the accuracy of data integrity. However, a small percentage of (4%) strongly disagreed while (18%) disagreed that data quality checks existed currently at the source of capturing to ensure data integrity. There was a moderate number of respondents (20%) chose neutral in respect of data quality checks. Winkler (2009:550) emphasizes the imperative of data quality checks at source of capturing. As a consequence, the uses of data affected by lack of quality due to duplication of records and missing values can waste money as well as yield many errors.

Figure 4.9 Instituting any data accuracy programme tool (n = 128)

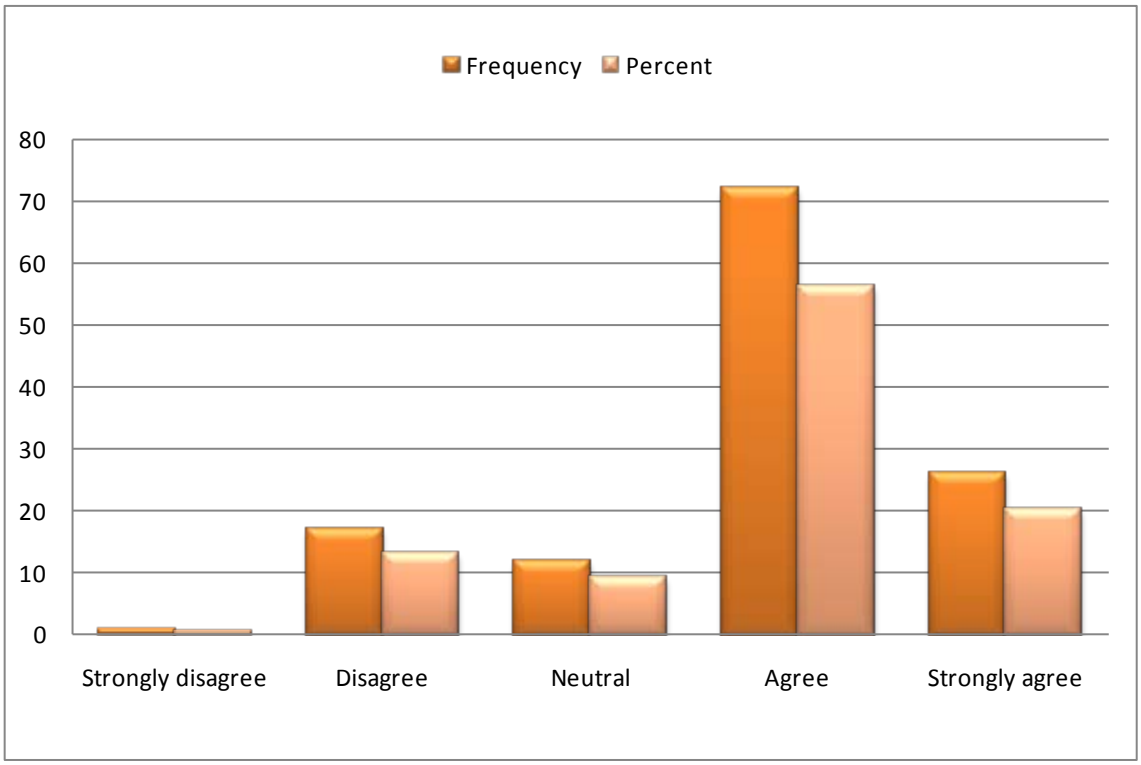
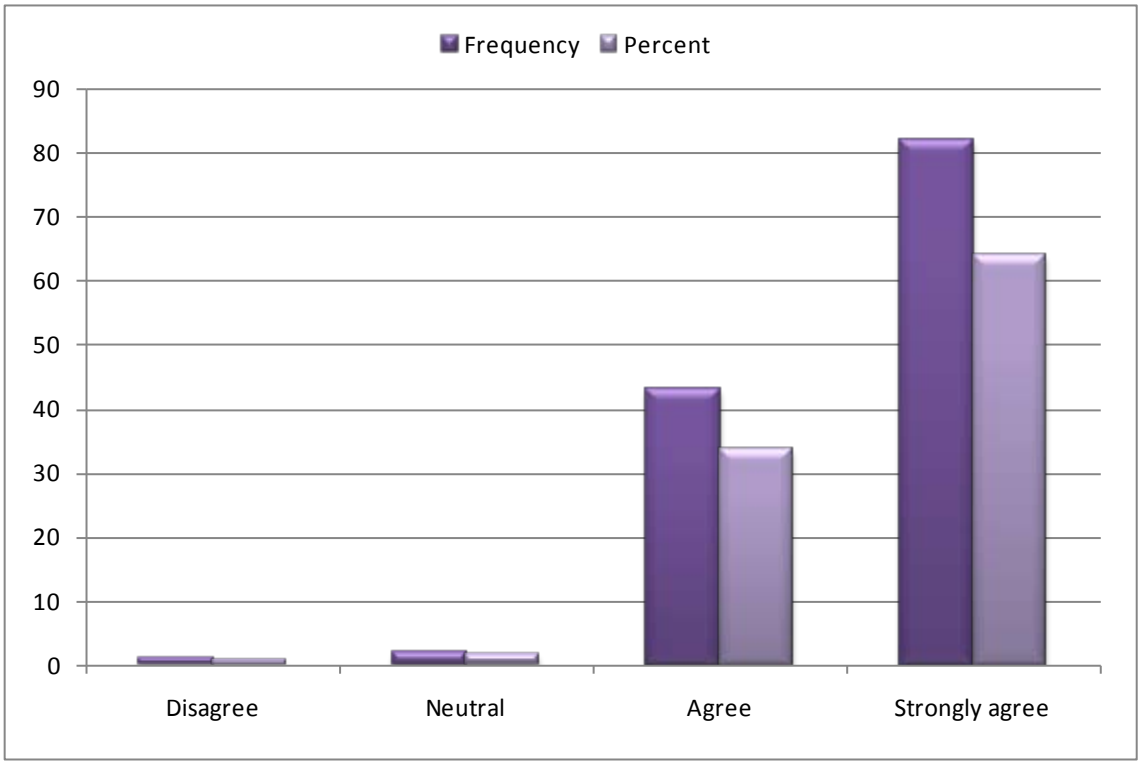



Figure 4.9 illustrates that 20% of the respondents strongly agreed that instituting any data accuracy programme tool involves additional resources and would have financial implications. A total of 76% of respondents either agreed and strongly agreed that instituting any data accuracy programme tool will involve additional resources and would have financial implications. One respondent (1%) and 13% of the respondents strongly disagreed and disagreed respectively with the above statement. There were 9% of the respondents who remained neutral.

Friedman (2006:2) highlights the negative impact of poor quality data, neglect of best practices for executing data quality improvement initiatives (including the organization and processing issues) and the evolution of data quality technology.

Figure 4.10 Proper data management will help improve strategic decision making (n = 128)




The responses to the statement that proper data management will help improve strategic decision making at the Durban University of Technology is presented in Figure 4.10. Eighty two respondents (64.1%) and 43 respondents (33.6%) comprised a total of 97% of the respondents that strongly agreed and agreed respectively to the statement that proper data management will help improve strategic decision making. The number of respondents that disagreed was a meagre 1 (0.8%). Two respondents (1.6%) remained neutral. The majority of the respondents agreed that proper data management will help improve strategic decision making at the Durban University of Technology. Cascarino (2007:59) concurs that if management cannot trust the reliability and integrity of the data, it may be more detrimental to the organization especially in the decision making process.

4.11 Data is regarded as an asset (n = 128)

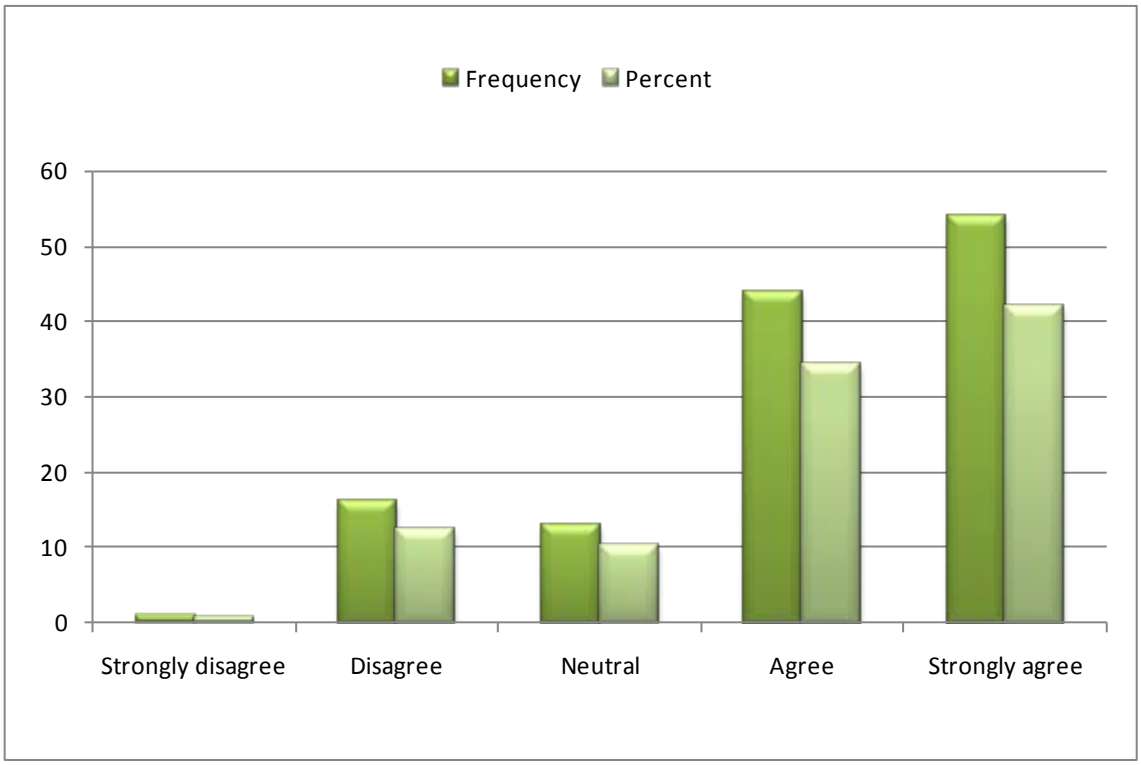
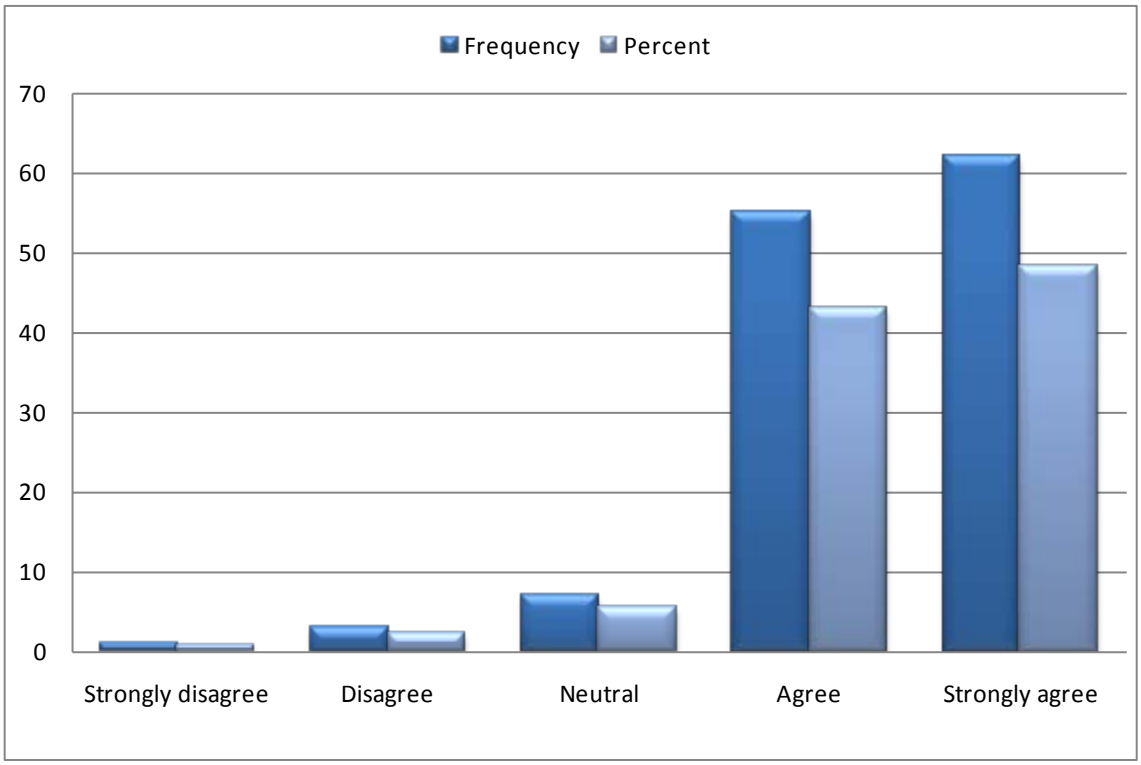



Figure 4.11 indicates that 54 respondents (42.2%) and 44 respondents (34.4%) strongly agreed and agreed respectively that data at the Durban University of Technology is regarded as an asset to the institution. The total number of respondents in agreement is therefore 98 respondents (76%). This is highly significant. One respondent (0.8%) and 16 respondents (12.5%) strongly disagreed and disagreed respectively that data at the Durban University of Technology is regarded as an asset to the institution. The total number in disagreement was 13.3%. Thirteen respondents (10.2%) were neutral. It would appear therefore that the majority of respondents regarded data at the Durban University of Technology as an asset to the institution. Friedman (2006:4) explains how there is a growing trend across large organizations to regard the management of information as a corporate asset. By classifying information in this manner, it allows organizations to maximize the value of their information assets.

Figure 4.12 Data must be analysed in order to assess accuracy (n = 128)




As illustrated by Figure 4.12, 48.4% of the respondents strongly agreed and 43% of the respondents agreed that data must be analysed in order to assess the accuracy of data management. One respondent (0.8%) and 3 respondents (2.3%) strongly disagreed and disagreed respectively. Only 7 respondents (5.5%) remained neutral. The overall results, therefore, imply that the majority (91%) of the respondents felt that data must be analysed in order to assess accuracy of data management. This is a significant finding with regard to data that should be analysed to assess accuracy. Wang and Strong (1996:6) reiterate that data quality problems go beyond accuracy to include aspects such as completeness and accessibility. Kleppner (2010:10) contends that openness, transparency and collective scrutiny of data are the best ways to ensure that errors are discovered earlier and corrected immediately to ensure the accuracy of data generated

Figure 4.13 Staff are aware of the consequence of incorrect data capturing (n = 128)

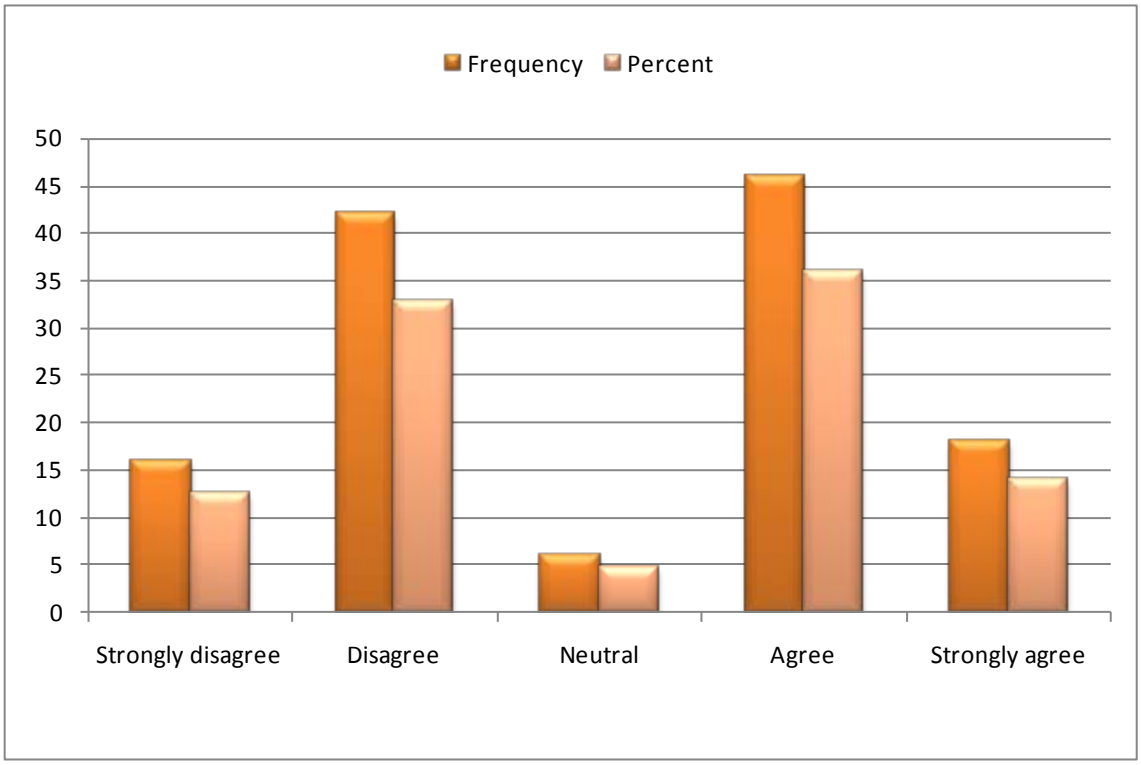
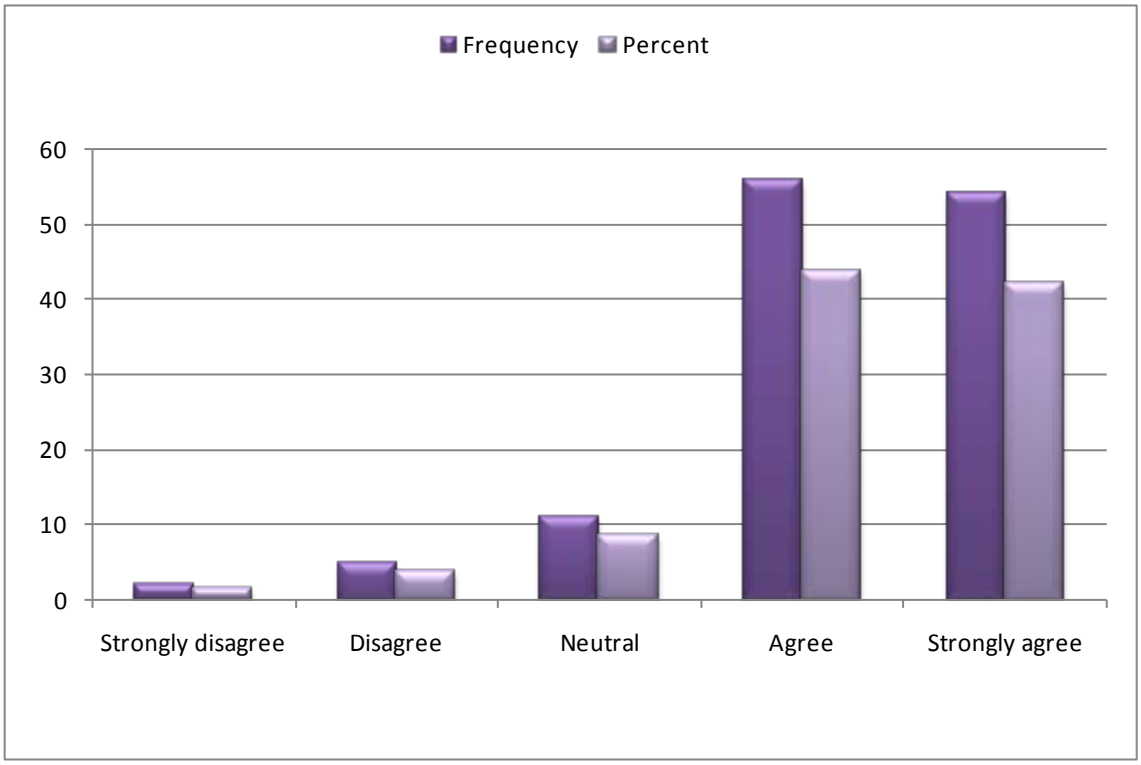


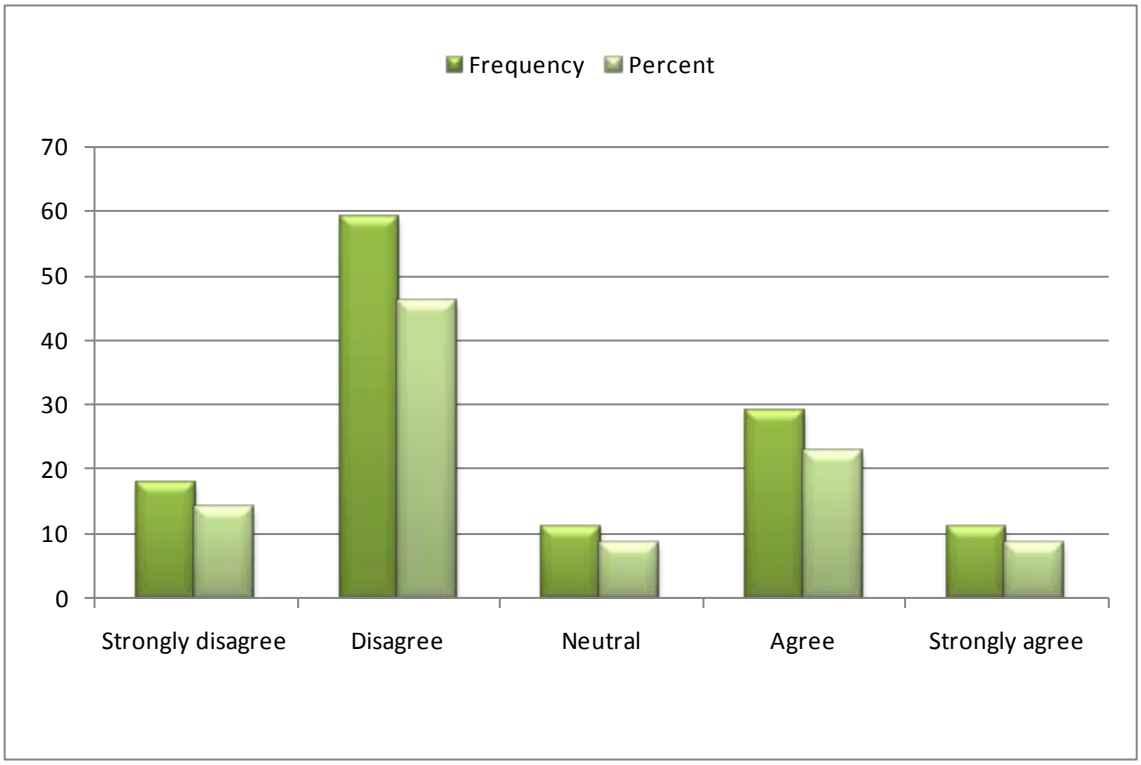

Figure 4.13 indicates that 18 respondents (14.1%) strongly agreed and 46 respondents (35.9%) agreed that staff were aware of the consequence of incorrect data capturing. Sixteen respondents (12.5%) and 42 respondents (32.8%) strongly disagreed and disagreed respectively. Six respondents (4.7%) remained neutral. It would appear therefore that the majority of the respondents agreed that staff at the Durban University are aware of the consequence of the incorrect data capturing. Wang and Strong (1996:21) relate the importance of data improvement which starts with an understanding of what data means to those who use the data. In general, the respondents at the Durban University staff understand the importance relating to correct data capturing.

Figure 4.14 Responsibility for data management and integrity must lie with capturers (n = 128)



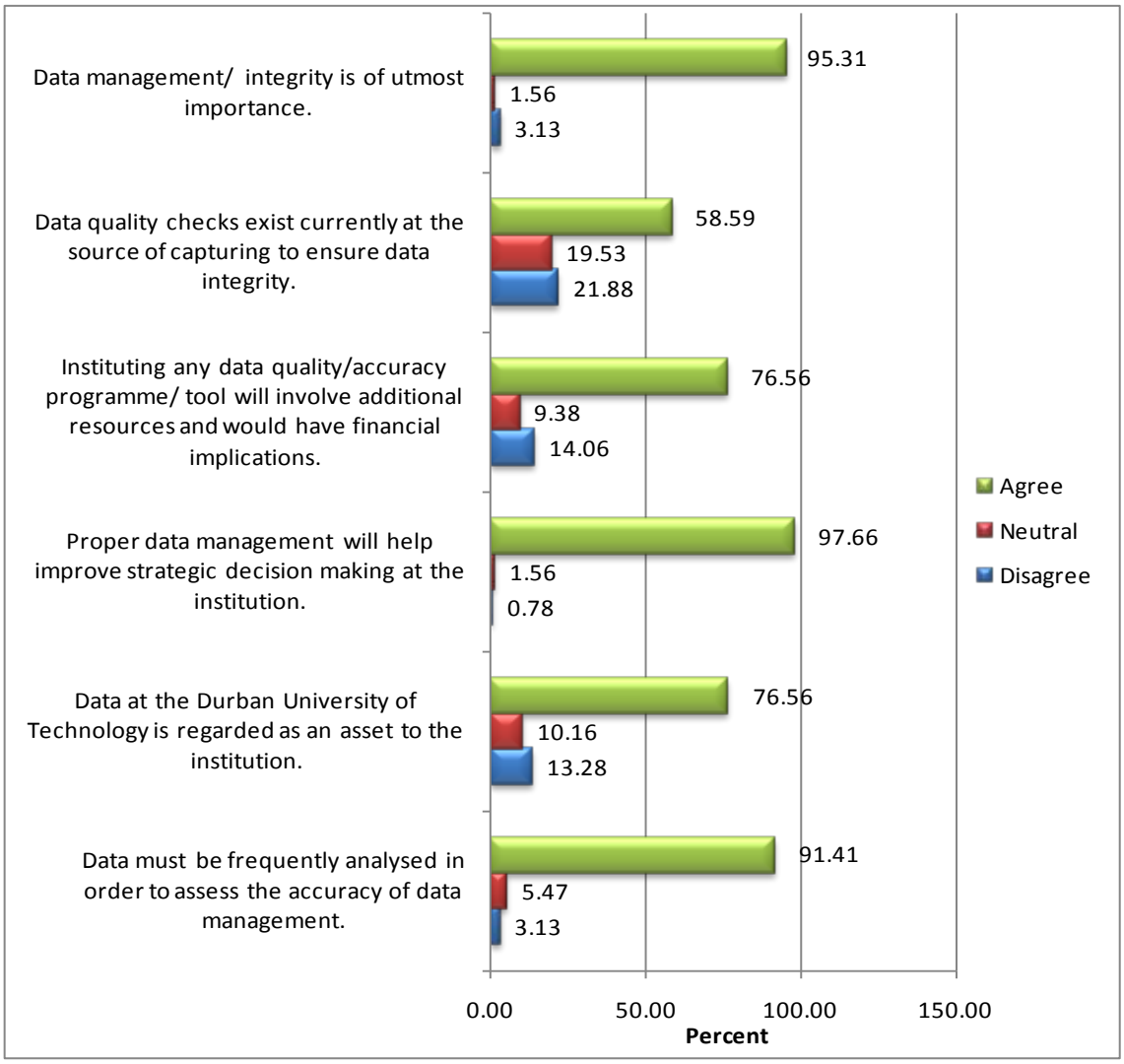

Fifty four respondents (42.2%) strongly agreed and 56 respondents (43.8%) agreed that responsibility for data management/integrity must lie with capturers as illustrated in Figure 4.14 above. The total that strongly agreed was 100 respondents (86%) which was highly significant. Two respondents (1.6%) and 5 respondents (3.9%) strongly disagreed and disagreed with the statement that responsibility for data management and integrity must lie with capturers. The total number of respondents in disagreement with the statement was a moderate 5.5%. It would therefore imply that the majority of the respondents agreed that the responsibility for data management and integrity must lie with capturers.

Figure 4.15 Staff consider flagging suspicious data as part of their job (n = 128)




The responses in relation to staff flagging suspicious data as part of their job at the Durban University of Technology is presented in Figure 4.15. Eleven respondents (8.6%) and 29 respondents (22.7%) comprised a total of 31.1% of the respondents who strongly agreed and agreed respectively that staff considered flagging suspicious data as part of their job. The number of respondents that disagreed were 18 (14.1%). Eleven respondents (8.6%) remained neutral. However, the majority of the respondents disagreed that the staff considered looking for and flagging suspicious data as part of their job at the Durban University of Technology.

Figure 4.16 Data Management and Integrity




As illustrated in Figure 4.16, 95.31% of the respondents strongly agreed that data management and integrity is of utmost importance which is a highly significant result while a mere (3.13%) respondents did not agree. A neutral response was reported by (1.56%) of the respondents. It would appear that the majority of the respondents in this study agreed that data management and integrity is of utmost importance.

## 4.8 HYPOTHESES TESTING

Wilson (2010:237) asserts that hypothesis testing is one of the main methods to test for significance using inferential statistics. It involves an analysis of some aspect of the statement or questions that generates a statistical value. This will determine whether the hypothesis can or cannot be rejected. The traditional approach to reporting a result requires a statement of statistical significance. For the statistical tests a confidence interval of 95% was used to statistically test the various hypotheses. A p-value is generated from a test statistic. A significant result is indicated if the p value is less that 0.05.

In this study the Pearson Chi square test was performed for the various hypotheses formulated. Karl Pearson as referenced by Treiman (2009:93) was the principal developer of the linear regression and correlation and in recognition of this the ordinary least square and correlation is known as Pearson's r. Muijs (2011:124) refers to Pearson's r as whether or not a high score on one variable is associated with a high score on the other.

Hypothesis 1

There is a significant relationship between the perceptions of staff and the frequency the data analysed to determine the accuracy.

Table 4.4 Frequency of data analysis for accuracy (n = 128)

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 79. | 40 | 0.000 |
| Likelihood Ratio | 51.489 | 40 | 0.105 |
| Linear-by-Linear Association | 9.087 | 1 | 0.003 |
| N of Valid Cases | 128 | | |

*Pearson Chi-square = 79.101, df = 40, Significance p<0.000

Table 4.4 reveals that the results reflect a significant association between staff category the frequency that data is analysed to determine accuracy. A Pearson's test showed a highly significant ($p < 0.001$) value. Vuong, Michelau and Prescott (2011:4) states that collecting the right data and ensuring their accuracy are basic protocols. However, equally critical is the capacity to analyze and ensure that this data is usable. Peppard (1994:197) contends that employees who work directly with data in an organization often understand more about their jobs than managers or quality inspectors. Thus, with this knowledge they are most efficient to determine the accuracy by analyses. Wang and Strong (1996:9) also assert that staff should be provided with data that is relevant, accessible, easily interpreted in order for meaningful analysis to be conducted to determine integrity.

There is a significant correlation between data owners and the responsibility for data management and integrity.

Table 4.5 Frequency of data owners and responsibility for accuracy (n = 128)

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 61. | 40 | 0.016 |
| Likelihood Ratio | 57.949 | 40 | 0.033 |
| Linear-by-Linear Association | .903 | 1 | 0.342 |
| N of Valid Cases | 128 | | |

*Pearson Chi-square = 61.612, df = 40, Significance p<0.016

Table 4.5 revealed that the Chi-square test result showed that the p value is 0.016, which is less than 0.05. This result indicates that there is a statistically significant correlation between the data owners and the responsibility for data management/integrity. Eckerson (2002:6) highlights how data defects easily creep into systems. Thus, maintaining data quality at acceptable levels takes considerable effort and coordination throughout the organization. Kleppner (2010:9) affirms that data owners (researchers) are ultimately responsible for the integrity of data. Friedman (2006:4) argues that data management is a major initiative for large organizations as they strive for greater integrity and consistency across the organization. Organizations should therefore understand the role of data management in relation to their overall business performance and decisive decision making.

There is a significant relationship between the importance of data management and integrity and the length of service of staff

Table 4.6 Importance of data management and length of service of staff (n = 128)

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 47. | 21 | 0.001 |
| Likelihood Ratio | 26.069 | 21 | 0.204 |
| Linear-by-Linear Association | 9.522 | 1 | 0.002 |
| N of Valid Cases | 128 | | |

*Pearson Chi-square = 47.215, df = 21, Significance p<0.001

Table 4.6 shows that the Chi-square test revealed that the p value is 0.001. This result illustrates that there is a significant relationship between the importance of data management and integrity and the length of service of staff at the Durban University of Technology. Ellis (2005:37) highlights how working for a significant number of years in a knowledge based environment means that the employee is recognised and rewarded for what they know and how they apply this know-how to the accuracy of data management and integrity. Alavi and Leidner (2001:113) assert that staff gains knowledge into the data management while completing projects. Thus, the more completed projects over the years of services permits increase in awareness of the importance of data management.

There is a significant relationship between flagging suspicious data and the job description of staff.

Table 4.7 Frequency of flagging suspicious data and job descriptions of staff (n = 128)

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 60. | 40 | 0.019 |
| Likelihood Ratio | 64.379 | 40 | 0.009 |
| Linear-by-Linear Association | .644 | 1 | 0.422 |
| N of Valid Cases | 128 | | |

*Pearson Chi-square = 60.600, df = 40, Significance p<0.019

Table 4.7 reveals that the above Chi-square test result shows that the p value is 0.019. This result indicates that there is a significant relationship between flagging suspicious data and the job profiles of staff at the Durban University of Technology. Cascarino (2007:81) states that in many organizations far too much power has been granted to users who have access and some users have an in-depth knowledge of the system's control weakness and are in the position to exploit them. As a result flagging suspicious data would have to be intentionally included in their staff job descriptions. Vuong, *et al.* (2011:4) affirms that staff with the right data skills are able to conduct and interpret the analysis of data thus flagging suspicious data.

There is a significant correlation between knowledge of data management of staff in the departments and the prevalence of data quality initiatives

Table 4.8 Prevalence of data quality initiatives within Departments (n = 128)

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 44. | 30 | 0.047 |
| Likelihood Ratio | 44.984 | 30 | 0.039 |
| Linear-by-Linear Association | .254 | 1 | 0.614 |
| N of Valid Cases | 128 | | |

*Pearson Chi-square = 49.050, df = 30, Significance p<0.047

Table 4.8 shows that the Chi-square test p value is 0.047. This result shows that there is a significant correlation between knowledge of data management of staff in departments and the prevalence of data quality initiatives. Ellis (2005:37) regards process knowledge as recipes for doing things well. These are often collected through benchmarking or best practices and this knowledge is useful in optimising operations and increasing efficiency. Kleppner (2010:12) reiterates that by designing and managing operations the integrity of data can be ensured.

## 4.9 CONCLUSION

The analysis of data gathered in the empirical component of this study is presented in this chapter. This chapter focused on describing the analysis of the data and the discussion of the findings of the survey. The various results were graphically depicted in tabular and statistical formats. The results have identified significant relationships and differences between the variables by way of the hypotheses tested. The next chapter deals with tentative recommendations arising from the empirical analysis of the data and gives directions for further research.

# CHAPTER 5

# CONCLUSION AND RECOMMENDATIONS

## 5.1 INTRODUCTION

The conclusions and recommendations presented in this chapter are the outcomes of the findings and the evaluations of the empirical results. This research study intended to investigate the impact of data management as a strategic tool at the Durban University of Technology. The main aim of the study was to effectively utilize data management as a strategic information tool in order to provide all levels of management and stakeholders with accurate management information to support strategic decision making, planning, policy development and quality processes. A pre-coded closed ended questionnaire using the 5 point Likert scale was administered to the target population. There was a significant response rate of 74% which was largely due to the fact that it was an in-house study and a personal method was used in the data collection. There were some significant findings that emerged from the empirical analysis of the results.

## 5.2 CONCLUSION

The main reason for this study was to investigate data management as a strategic information tool and its importance at the Durban University of Technology. What was revealing was that staff are generally aware of the significance of the data that they dealt with from the time as they received it until it gets captured and verified. Data management and data integrity may be distinct yet have overlapping fields. Each has its own focus and each discipline fulfills different purposes within an organization. However, it is becoming more evident that the coordination of data management and data integrity can increase an organization's efficiency and effectiveness. Arising from the empirical analysis of the data the following recommendations are suggested.

## 5.3 RECOMMENDATIONS

### 5.3.1 KNOWLEDGE TRANSFER

It is recommended that staff in the faculty office should be given on the job training by their Faculty Officer who have extensive knowledge. Similarly, Ellis (2005:29) asserts that the importance of developing employee knowledge beyond basic understanding of job requirements is not required and is largely an activity that should be separate from work itself. Alavi and Leidner (2001:128) contend that the ease with which individuals are able to transfer their explicit components of their knowledge to their work situation is expected to transfer more than verbal or face-to-face communication.

### 5.3.2 VERIFICATION PROCESS

It is critical that verification process should be done immediately after the data is captured in order to reduce the errors. Eckerson (2002:4) emphasizes that validation routines cannot catch typographical errors where the data represents a valid value. While Cascarino (2007:11) contends that when it comes to an on-line system, it permits remote entry of data and also allows for concurrent processing of data. It is imperative that there should be transaction authenticity as well as accuracy and completeness of the data management. Madanjit (2006:18) also argued that users at the Durban University of Technology sometime captured only fields that they were using and did not capture required fields by the institution. He also stated that data was sometime not verified against source documents. Hence, the verification of data should be expedited immediately for its accuracy and integrity.

### 5.3.3 PROCEDURES AND PROCESSES FOR DATA MANAGEMENT

The effective implementation of procedures and processes is critical at the Durban University of Technology and should be crucial for decision making. Cascarino (2007:63) states that in order for controls to be effective for data management, those that exercise control must be capable of doing so and honest enough to do so consistently. This in itself has a high degree of risk and control awareness in order to ensure that procedures and processes function accordingly.

### 5.3.4 ASSIGNING ACCOUNTABILITY FOR DATA MANAGEMENT

Kavanagh and Suppert (2007:3) state that there must be accountability in order to achieve the results and realizing the value for the organization. Similarly, at the Durban University of Technology there should be accountability especially at the level of capturing. Madanjit (2006:16) contended that in order to ensure accuracy of data at the Durban University of Technology, Executive Deans, the Registrar, Directors and Heads of Departments should take ownership of the data by being accountable and responsible for the integrity of the data.

### 5.3.5 ESTABLISHMENT OF DATA INTEGRITY AND INTERGRATION POLICY

In order for the Durban University of Technology to manage its data as an asset, a policy on data integrity and integration policy should be developed and implemented. Similarly, Neuman (2006:2) at the University of Nevada highlighted that one out of a number of Universities have found a better method to drive data integrity throughout the entire University community.

### 5.3.6 PROPER RECORDING ON THE DATABASE

At the Durban University of Technology staff should strive to attain proper classification on the database considering that this directly impacts on the accuracy of the HEMIS submissions to the Ministry of Education that affects the state allocated subsidy for the institution. Sheppard (2006:24) concurred with this viewpoint when he stated that the correctness of classification on the database determines subsidy income from the Department of Higher Education and Training (DHET). Thus proper recording on the database should form an integral component for DHET to allocate equitable state subsidies accordingly.

## 5.4 LIMITATIONS OF THE STUDY

The research undertaken had certain limitations, namely:

- There was limited current literature that focused specifically on data management within higher education institutions. Hence, use was made of accredited authors who were highly knowledgeable in this field.
- In order to fully assess data management and its importance at the Durban University of Technology, all stakeholders should have formed part of the sample. However, this was beyond the scope of this study as it would have become too time consuming and longitudinal in nature.
- The data gathered was from a specific geographic University of Technology in Kwa-Zulu Natal in South Africa. As a result, this study highlights the findings and results specific to the Durban University of Technology in Kwa-Zulu Natal. Thus, the results cannot be generalized to other University of Technologies as situational factors may differ.

## 5.5 SUGGESTIONS FOR FUTURE RESEARCH

The research undertaken highlighted important and interesting insights into data management and its importance at the Durban University of Technology. This study has the potential to add value to higher education institutions and to the Ministry of Education, by effectively providing accurate and complete data. Since this study was limited to only one higher education institution, further research could include other Universities of Technology across the other provinces. This may provide valuable and comparable insights into data management and data integrity as key components for strategic decision making in HE Institutions in South Africa.

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**Annexure A**

## LIST OF ACRONYMS AND ABBREVIATIONS

| | | |
|---|---|---|
| SAPSE | - | South African Post Secondary Education |
| HEMIS | - | Higher Education Management Information System |
| DHET | - | Department of Higher Education and Training |
| MIS | - | Management Information Systems |
| ITS | - | Integrated Tertiary Software |
| HE | - | Higher Education |
| HEI | - | Higher Education Institution |

## Annexure B

## Table of Summary chi square tests.

| | Race | Age | Length of Service | Campus | Sector | Category |
|---|---|---|---|---|---|---|
| Data management/ integrity is of utmost importance. | 0.255 | .001* | .001* | 0.99 | 0.795 | 0.125 |
| Data quality checks exist currently at the source of capturing to ensure data integrity. | 0.411 | 0.807 | 0.563 | 0.733 | 0.704 | 0.096 |
| Instituting any data quality/accuracy programme/ tool will involve additional resources and would have financial implications. | 0.152 | 0.607 | 0.922 | 0.966 | 0.84 | 0.144 |
| Proper data management will help improve strategic decision making at the institution. | 0.227 | 0.747 | 0.881 | 0.946 | 0.459 | 0.291 |
| Data at the Durban University of Technology is regarded as an asset to the institution. | 0.095 | 0.646 | 0.394 | 0.641 | 0.132 | 0.076 |
| Data must be frequently analysed in order to assess the accuracy of data management. | 0.478 | 0.203 | 0.681 | 0.928 | 0.118 | .000* |
| Staff are aware of the consequence of incorrect data capturing. | 0.16 | 0.622 | 0.424 | 0.477 | 0.873 | 0.601 |
| The responsibilities for data management/ integrity must lie with the data owners. | .015* | 0.179 | 0.656 | .048* | 0.206 | .016* |
| Does the Staff consider looking for and flagging suspicious data as part of their job. | 0.363 | 0.562 | 0.78 | 0.933 | 0.112 | .019* |
| To ensure data quality it is imperative that we build capacity for staff regarding data ownership and accountability. | 0.389 | 0.94 | 0.145 | 0.946 | 0.635 | 0.906 |
| Durban University of Technology is protected, managed and monitored appropriately to ensure no breach in security. | 0.608 | 0.74 | 0.327 | 0.119 | .028* | 0.233 |
| It is vital to maintain confidentiality of data within sectors at the Durban University of Technology for good ethical practice. | 0.556 | 0.611 | 0.551 | 0.795 | .003* | 0.064 |
| Staff are informed of policies and procedures in their department. | 0.595 | 0.907 | 0.64 | 0.443 | 0.927 | 0.326 |
| Proper data management requires strict adherence to policies and procedures. | 0.677 | 0.721 | 0.665 | 0.945 | 0.596 | 0.345 |
| At which level at the Durban University of Technology should data management/integrity checks be implemented? | 0.513 | 0.207 | 0.401 | 0.825 | 0.796 | 0.199 |
| Who must be responsible for data management /integrity of student data at the Durban University of Technology? | .004* | 0.971 | 0.308 | 0.652 | 0.075 | 0.283 |
| Who must be responsible for data management /integrity of staff data at the Durban University of Technology? | 0.254 | 0.509 | 0.085 | 0.544 | 0.395 | 0.394 |
| How often do data quality initiatives occur at the Durban University of Technology? | 0.493 | 0.401 | 0.571 | 0.86 | 0.351 | .047* |

**Annexure C**

6 June 2011

Dear Respondent

**Assistance: Questionnaire Completion – M. Tech Degree in Public Management**

I am a registered student at the Durban University of Technology and currently pursuing the M.Tech Degree in Public Management. My topic is entitled: "Data management as a strategic information tool and its impact at Durban University of Technology". This topic was derived in order to emphasize the importance of accurate and complete data that is submitted to the Department of Higher Education and Training.

You have been identified as one of the respondents for the survey. The questionnaire would take about 10-15 minutes to complete and only requires you to tick the relevant pre-coded responses in an objective manner. Please be rest assured that your responses will be treated with utmost confidentiality and will not be divulged to any other party. In addition, the responses to the questionnaire, once collated, will be used for statistical purposes only. A brief summary of the main findings will be posted to you on completion of the project.

Your co-operation in assisting me with this important component of my study is highly appreciated and I look forward to a speedy return of the questionnaire. If there are any queries, please do not hesitate to contact me. I take this opportunity of again thanking you in advance.

Kindly return completed questionnaires by the June 2011 to the address below.

Sincerely

.....

Ramani Francis
Student No. 19251811

Department of Management Information
M L Sultan Campus, Block D, Floor
@dut.ac.za
Tel: 031 373 5488

**Annexure D**

**QUESTIONNAIRE**

Instructions to Respondents

- Place only one √ or circle for each answer.
- Answer all questions.

1. Please indicate your race.

| | | |
|---|---|---|
| 1.1 | African | 1 |
| 1.2 | Coloured | 2 |
| 1.3 | Indian | 3 |
| 1.4 | White | 4 |
| 1.5 | Other | 5 |

2. Please indicate your age.

| | | |
|---|---|---|
| 2.1 | Under 25 | 1 |
| 2.2 | 25 – 30 | 2 |
| 2.3 | 31 – 35 | 3 |
| 2.4 | 36 – 40 | 4 |
| 2.5 | 41 – 45 | 5 |
| 2.6 | 46 – 50 | 6 |
| 2.7 | 51 – 55 | 7 |
| 2.8 | 56 – 60 | 8 |
| 2.9 | > 61 | 9 |

3. Please indicate your length of service at Durban University of Technology (in years).

| | | |
|---|---|---|
| 3.1 | Under 1 | 1 |
| 3.2 | 1 – 5 | 2 |
| 3.3 | 6 – 10 | 3 |
| 3.4 | 11 – 15 | 4 |
| 3.5 | 16 – 20 | 5 |
| 3.6 | 21 – 25 | 6 |
| 3.7 | 26 – 30 | 7 |
| 3.8 | 31 – 35 | 8 |
| 3.9 | Over 36 | 9 |

4. Please indicate at which campus you are based.

| | | |
|---|---|---|
| 4.1 | Durban | 1 |
| 4.2 | Indumiso | 2 |
| 4.3 | Pietermaritzburg | 3 |

5. Please indicate the sector you represent.

| | | |
|---|---|---|
| 5.1 | Academic | 1 |
| 5.2 | Academic Support | 2 |
| 5.3 | Institutional Support | 3 |
| 5.4 | Technology, Innovation and Partnerships | 4 |

6. Please select the category you represent.

| | | |
|---|---|---|
| 6.1 | Academic Data and Student Records | 1 |
| 6.2 | Centre for Quality Promotion and Assurance | 2 |
| 6.3 | Examinations | 3 |
| 6.4 | Executive/ Deputy Dean | 4 |
| 6.5 | Faculty Office staff | 5 |
| 6.6 | Faculty Officers | 6 |
| 6.7 | Head of Department | 7 |
| 6.8 | Information Technology Support Services | 8 |
| 6.9 | Management Information | 9 |
| 6.10 | Research Management and Development | 10 |
| 6.11 | Senior Human Resources Officer | 11 |
| 6.12 | Student Admissions and Enquiries | 12 |

7. In respect to data management please indicate to what extent you agree or disagree with each of the following statements:

| | | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| **Data Management/ Integrity** | | | | | | |
| 7.1 | Data management/ integrity is of utmost importance. | 1 | 2 | 3 | 4 | 5 |
| 7.2 | Data quality checks exist currently at the source of capturing to ensure data integrity. | 1 | 2 | 3 | 4 | 5 |
| 7.3 | Instituting any data quality/accuracy programme/ tool will involve additional resources and would have financial implications. | 1 | 2 | 3 | 4 | 5 |
| 7.4 | Proper data management will help improve strategic decision making at the institution. | 1 | 2 | 3 | 4 | 5 |
| 7.5 | Data at the Durban University of Technology is regarded as an asset to the institution. | 1 | 2 | 3 | 4 | 5 |
| 7.6 | Data must be frequently analysed in order to assess the accuracy of data management. | 1 | 2 | 3 | 4 | 5 |

| | | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| **Responsibility** | | | | | | |
| 7.7 | Staff are aware of the consequence of incorrect data capturing. | 1 | 2 | 3 | 4 | 5 |
| 7.8 | The responsibilities for data management/ integrity must lie with the data owners. | 1 | 2 | 3 | 4 | 5 |
| 7.9 | Does the Staff consider looking for and flagging suspicious data as part of their job. | 1 | 2 | 3 | 4 | 5 |
| 7.10 | To ensure data quality it is imperative that we build capacity for staff regarding data ownership and accountability. | 1 | 2 | 3 | 4 | 5 |
| 7.11 | Durban University of Technology is protected, managed and monitored appropriately to ensure no breach in security. | 1 | 2 | 3 | 4 | 5 |
| 7.12 | It is vital to maintain confidentiality of data within sectors at the Durban University of Technology for good ethical practice. | 1 | 2 | 3 | 4 | 5 |
| **Policies** | | | | | | |
| 7.13 | Staff are informed of policies and procedures in their department. | 1 | 2 | 3 | 4 | 5 |
| 7.14 | Proper data management requires strict adherence to policies and procedures. | 1 | 2 | 3 | 4 | 5 |

8. At which level at the Durban University of Technology should data management/integrity checks be implemented?

| | | |
|---|---|---|
| 8.1 | Point of capturing | 1 |
| 8.2 | Departmental level | 2 |
| 8.3 | Faculty level | 3 |
| 8.4 | Throughout the institution | 4 |

9. Who must be responsible for data management /integrity of **student** data at the Durban University of Technology?

| | | |
|---|---|---|
| 9.1 | Capturers | 1 |
| 9.2 | Faculty Officers | 2 |
| 9.3 | Dean | 3 |
| 9.4 | Registrar | 4 |

10. Who must be responsible for data management /integrity of **staff** data at the Durban University of Technology?

| | | |
|---|---|---|
| 10.1 | Capturers | 1 |
| 10.2 | Officers | 2 |
| 10.3 | Faculty Managers | 3 |
| 10.4 | Director | 4 |

11. How often does data quality initiatives occur at the Durban University of Technology?

| | | |
|---|---|---|
| 11.1 | Very often | 1 |
| 11.2 | Fairly often | 2 |
| 11.3 | Rarely | 3 |
| 11.4 | Not at all | 4 |

12. What is your view regarding the importance of data management/ integrity at the
Durban University of Technology which is submitted to the Department of Higher Education and Training on an annual basis?

_____

_____

_____

_____

_____

_____

**Thank you for completing the questionnaire.**