UNIVERSITY OF KWAZULU-NATAL

THE EFFECTIVE MANAGEMENT OF INFORMATION OVERLOAD WITHIN SHIPPING COMPANIES IN SOUTH AFRICA

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DECLARATION

I Mohamud Irshad Mungly declare that:

(i) The research reported in this dissertation, except where otherwise indicated, is my original research.

(ii) This dissertation has not been submitted for any degree or examination at any other university.

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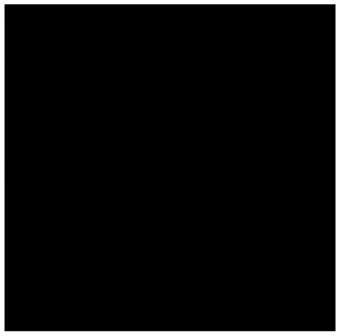

DEDICATION

To my father, Hassamjee Mungly, who challenged me to go beyond my imagination and strive to achieve the best educationally and to my beloved mother, Saidabee Mungly, for her ongoing love, support and but sadly who could not see this thesis completed… I miss you mum.

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- All those who responded and showed interest in the survey.

ABSTRACT

For time immemorial, humans have shared information – from cave wall paintings to modern computing devices. The medium and channels of communication have evolved and improved. The ever-growing number of information sources coupled with the development of the Internet and other electronic communication technologies has resulted in escalating amounts of data and information that users need to process. This has resulted in a situation commonly known as information overload. Information overload can be described as a situation where people are inundated with more information than they are able to usefully use.

The overall aim of this study was to establish whether information overload exists in South African shipping companies and if it is being formally managed. Although a growing body of empirical research has assessed the impact of information overload in organisations, little is known about its effect on shipping companies. To fully understand the problem, the impact of information overload was assessed in 12 shipping organisations located in Durban. Quantitative data was gathered using an online questionnaire from a sample of 491 employees in the 12 organisations. Twelve decision makers, one in each organisation, were interviewed by means of semi-structured interviews.

The quantitative data showed that employees are overloaded with information and the level of information overload varies across the different organisations. Qualitative data from the interviews showed that the decision makers are overloaded and admit that their staff are also overloaded. Furthermore, none of the companies had specific initiatives in place to help staff who were overloaded with information.

Several countermeasures to reduce information overload have been suggested in the literature; however, none of them have been proven to eliminate the problem.

By integrating the findings from the literature review, quantitative data and qualitative data, this study suggests some guidelines of good practice for managing information overload which includes information management training, information personal management system, good office ergonomics practices, technology, external service providers, correct communication technologies and monitoring of information.

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LIST OF ACRONYMS AND ABBREVIATIONS

ANCOVA	analysis of covariance
ANOVA	analysis of variance
CEO	chief executive officer
CIO	chief information officer
CSCW	computer supported collaborative work
CSR	corporate social responsibility
CTO	chief technology officer
DSS	decision support systems
EDI	electronic data interchange
ERP	enterprise resource planning
ES	expert system
ESS	executive support systems
FDI	foreign direct investment
FTW	Freight Trade Weekly
GDSS	group decision support systems
GM	general manager
IT	information technology
IS	information systems
KPIs	key performance indicators
KWS	knowledge work systems
MIS	management information systems
MMS	multimedia messaging service
OAS	office automation systems
OIS	office information systems
PDA	personal digital assistant
R&D	research and development
RSS	rich site summary
SMS	short message service
TPS	transaction processing system

CHAPTER ONE

OVERVIEW OF THIS STUDY

1.1 INTRODUCTION

Relationships are of great importance in business, especially today in the age of globalisation and internationalisation of businesses. High quality communication, in terms of frequency and richness of information, is necessary for developing strong relationships between the different stakeholders such as owners, employers, employees, buyers and suppliers (Klanac, 2005). Organisations have recognised the importance of effective communication as shown by the increasing expenditure on communication technologies. For example, in 2010, American businesses spent over $562 billion on information technology and a further $800 billion on consulting and services to redesign business operations and processes to take full advantage of the latest technologies (Laudon & Laudon, 2012). In most companies today, information has become one of the most important assets; however, the way that information is managed can make all the difference to the failure or success of the entity. Information is an economic resource which can be measured on the same level as other resources such as human capital, capital, and fixed assets.

This first chapter provides a discussion and context realisation of the problem of information overload as a modern problem facing organisations which extends it to the shipping industry. This chapter also summarises the methodology employed for this study.

1.2 CONTEXT OF THE STUDY

Due to organisations becoming more integrated with technology, and the advancement of technology and globalisation, there has been an accelerated production of information through business, media, education and science (Kock, Parente & Verville, 2008; Velez, 2008). Internet-based media, such as e-mail, blogs, instant messaging, social networks and tweets have facilitated information distribution and knowledge acquisition (Hu & Chen, 2011). Both the volume of information available to decision makers and employees and the volume of information that they handle throughout the course of their day-to-day work are

substantial. Too much information can result in poor decision making as there is a need for more resources, especially time to process the information (Zhuang, Qiu & Peng, 2011). In short, information overload occurs when the amount of information received is greater than what can be processed.

The shipping industry has not been spared from information overload. There has been a dramatic increase in the flow of information exchanged between the vessels and the offices on land across the multiple ports and countries (Houtman, Miedema, Jettinghoff, Starren, Heinrich, Gort, Wulder & Wubbolts, 2005). Mills (2006) mentioned that information overload occurs because of various information sources such as radar, telephone, fax, computer screens and intercoms which sometimes have been blamed for accidents and collisions of shipping vessels. In addition, hyper competition and the volatile business environment that results from globalisation and technological development have affected shipping companies.

1.3 EXISTING RESEARCH

The term information overload was popularised by Toffler (1970) who stated that there is a threshold in the amount of information a human brain can absorb and handle. Beyond that threshold the brain becomes overloaded, reasoning is blurred, and can cause physical and mental disturbances. There have been multiple studies on information overload across several industries using quantitative, qualitative and mixed methods. Table 1.1 identifies a selection of previous studies of information overload.

Table 1.1: Information overload by industries

Industry	Authors
Management and business	Butcher (1995)
Business organisations	Edmunds and Morris (2000)
Multi Industry	Ho and Tang (2001)
Industry Reports Articles and Papers Energy and utility Pharmaceutical Financial Publishing Logistics	Ho and Tang (2001)
Investment and securities	Paredes (2003)
Agriculture and the food industry	Verbeke (2005)
South African banking industry	Burger and Rensleigh (2007)
Libraries	Israel (2010)
Scientific community	Baez, Birukou, Casati and Marchese (2010)
Database	Veel (2011)
Healthcare	MacDonald, Bath and Booth (2011)
Investors	Bloch (2011)
Legal	Kuhn (2011)
Pharmaceutical industry	Sherlock (2011)
Information technology	Denton and Richardson (2012)
Tourism	Park and Jang (2012)
Human resource management	Brock and Buckley (2013)

It is evident from Table 1.1 that whilst many studies have been conducted in financial, healthcare and banking sectors, among others, none have been conducted in the shipping industry. Furthermore, very few studies were conducted in South Africa. For example, some of the few studies conducted in South Africa were in the fields of pharmaceutical (Rochat, 2002) and banking (Burger & Rensleigh, 2007).

1.4 FOCUS OF THE STUDY

The primary focus of this study was to analyse and explore in-depth information regarding the antecedents and consequences of information overload on employees' processing and judgments and how to manage it. More specifically, this study applied this focus in the form of an assessment of employees and managers in the Durban shipping industry in order to evaluate the awareness of information overload and to compare the level of information across some of the Durban shipping companies.

The South African shipping industry was chosen because South Africa is a leading foreign direct investment (FDI) destination on the African continent and it attracts investors looking to set up their African headquarters (Games, 2012). Furthermore, the Durban container terminal is the largest and busiest in the southern hemisphere (Transnet Port Terminals, 2015; World Shipping Council, 2015; Ports & Ships, 2016).

Another influential factor for choosing the shipping industry was largely due to the researcher's association with the shipping industry. From visual observation and informal discussions with staff, it was evident that they were being overloaded with information since the introduction of modern communication technologies such as the Internet, e-mail, and other corporate information systems and technologies. However, there was no empirical evidence available confirming that information overload existed or whether it was being managed within the Durban shipping industry.

1.5 PROBLEM STATEMENT

The extent to which information workers are experiencing information overload in South Africa is not covered in academic literature. The information worker is any person skilled in the provision of information to assist in making decision or providing sources of information to others to take actions or make decisions (Aina, 1994). Furthermore, there is even less known about the impact of information overload on management decision making in shipping organisations. The review of the literature has provided insight into the problem, causes and solutions to information overload. However, the solutions provided do not usually embrace the complexity of the problem (Eppler & Mengis, 2003). Therefore, it is crucial to assess different approaches to dealing with this challenge in a manner that will lower the information load on employees and decision-makers and help them in their day-to-day work and decision-making processes.

1.6 RESEARCH QUESTION

Based on the problem statement, the following is the one central research question that defined the scope of the study:

Does information overload exist in the South African shipping companies? If it exists, then is it being managed?

1.7 AIM AND OBJECTIVES

The aim of this study was to establish whether information overload exists in South African shipping companies and if it is being formally managed. Consistent with the aim, eight objectives were identified of which four were quantitative objectives and four qualitative objectives.

The quantitative objectives were to:

- determine whether employees are aware of information overload
- identify what the sources of information overload are
- assess the effect of information overload on employees
- compare the level of information overload amongst companies in the shipping industry

The qualitative objectives were to:

- establish management's awareness of information overload
- evaluate how companies are managing information overload
- determine the impact of information overload on companies
- establish guidelines for good practice in managing information overload

1.8 RESEARCH DESIGN

The convergent parallel mixed methods design was appropriate for this research study because it involved people from diverse backgrounds with their own agenda and expectations. This design method was also most suitable as both types of data could be collected at the same time about the same problem to mix or integrate the different results, such as comparing and contrasting them to produce well-validated conclusions.

The justification for mixing the two methods is that mixed methods provide more significant opportunities to gain a deeper understanding of complex information overload issues than would be possible with the use of either quantitative or qualitative data alone.

The quantitative aspect of the data collection aimed at determining awareness, effect and sources of information overload amongst employees. This data was also used to compare the level of information overload amongst companies in the shipping industry. To collect the data, an online and easy to understand questionnaire format was used with one open-ended response question, so that respondents had the benefit of posting extensive comments.

The researcher decided that by including a qualitative component, investigating the experiences of top managers with information overload in terms of awareness, impact and prevention, would undeniably add significant insights to such a study. The qualitative methods were used to establish guidelines for good practice for managing information overload phenomena about which little is yet known in the shipping industry. They could also be used to gain new perspectives on information overload and to gain more in-depth information that may be difficult to convey quantitatively. The qualitative data was collected by interviewing high-level managers.

1.9 LIMITATIONS OF THE STUDY

Three limitations of this study should be noted.

i. This study was done in one region (Durban) only and not nationally, due to human resource and time constraints.

ii. A shortage of academic literature on information overload in the shipping industry makes it difficult to conclude whether these results are typical to employees and managers in the shipping industry.

iii. There was no international literature regarding information overload in the shipping industry in other countries. Thus, the findings could not be compared to shipping industries elsewhere.

These limitations, however, add to the body of knowledge.

1.10 OUTLINE OF THE STUDY

This study is presented in eight chapters. Chapter one provides a background to the research by discussing key issues relating to the cause and effect of information overload on organisations and individuals. The motivation for the study is discussed to develop a clear sense of the problem and the aims of the study. Delimitation and limitations of the study are also provided.

The seven other chapters provide an overview of the related literature, followed by the methodology adopted, the results and analysis of the data from the questionnaires and interviews, integration and ending with the summary, conclusions, and recommendations. The details of these chapters are listed in Figure 1.1 below.

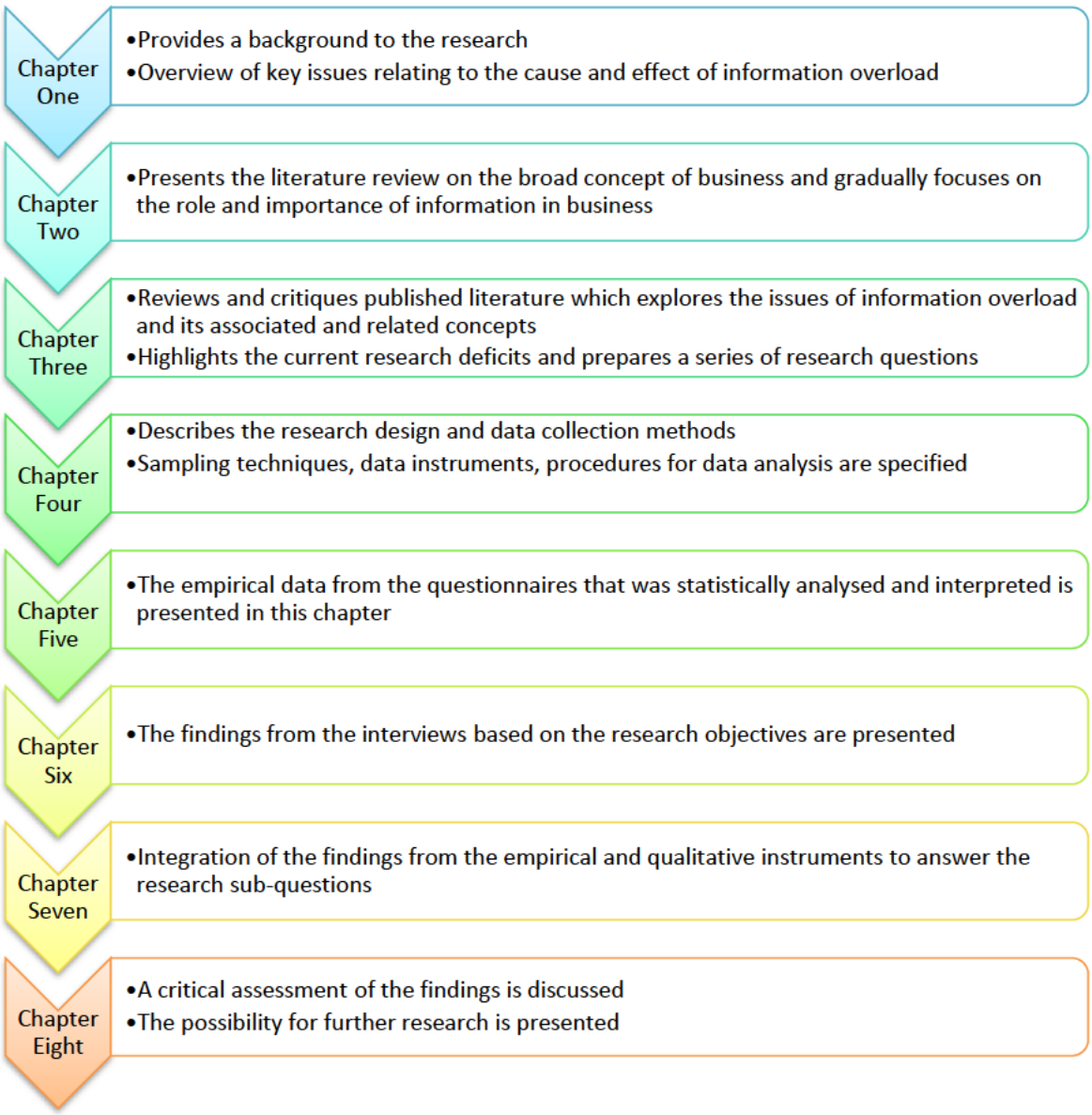

Figure 1.1: Outline of study

1.11 SUMMARY OF CHAPTER ONE

This chapter has outlined the purpose and objectives of the research study, highlighted the main focus and demarcated what the study covered. It has also briefly described information overload. Moreover, the limitations of the study were introduced. The next chapter provides the details of the literature review that was carried out to set the scene, establish deficits in the existing literature and arrive at new research questions.

CHAPTER TWO

BUSINESS AND COMMUNICATION

2.1 INTRODUCTION

Business relationships are immensely important in industrial markets, especially today in the age of globalisation and internationalisation of businesses. High quality communication, in terms of frequency and richness of information, is necessary for developing strong relationships between the different stakeholders such as owners, employers, employees, buyers and suppliers (Klanac, 2005). Organisations have recognised the importance of effective communication as shown by the increasing expenditure on communication technologies. For example, in 2010, American businesses spent over $562 billion on information technology, and a further $800 billion on consulting and services to redesign business operations and processes to take full advantage of the latest technologies (Laudon & Laudon, 2012). With organisations becoming more integrated with technology, there is also a potential for increased information for participants of business processes to an extent that the information input exceeds processing capability of these participants. This situation is commonly known as information overload.

This literature review offers a critical examination of the extant literature on aspects of information and information systems in business covering its role, organisation structure, stakeholders and strategy. Given the impetus of social media and social networking on businesses, it is important to achieve an understanding of the nature of social media in a networked economy. This chapter takes a pragmatic review of how information technology and information systems are intensifying the pressures behind an organisation's ability to use that information correctly for improving efficiency and decision making.

Following this overview, a synopsis of pertinent literature on business strategy, information technology and information systems and network economy, which provides the theoretical foundation for information overload, is presented.

2.2 STRUCTURE OF THE LITERATURE REVIEW

The review of the literature has been organised into a specific structure which is illustrated Figure 2.1.

Figure 2.1: Structure of the literature review

As per the illustration of Figure 2.1, this chapter commences with the broad concept of business and eventually focuses on the networked economy, while keeping information as the common thread.

The chapter begins with a review of the role of business by emphasising stakeholders' benefits. Stakeholders in businesses are more important than ever because of the interconnected nature of the world. For example, issues such as economic development, poor educational performance, natural resources management, crime, AIDS, global warming and terrorism all involve numerous people, groups and organisations (Bryson, 2004). This is followed by a description of business strategies and organisational structure with emphasis on information and communication amongst functional units and stakeholders. With information as a common thread, the next section covers information systems and information technologies. Since the main concept of this chapter is business

and communication, the role of information in the organisation and the quality of information are explained.

As the success of modern enterprises is directly related to the quality of information systems and information technologies used by the company (Lipaj & Davidaviciene, 2013), the alignment of information technology (IT) strategy to business strategy is clarified next. Finally, the networked economy is illustrated with references to electronic collaboration tools.

2.3 ROLE OF BUSINESS

Business, environment, society and economy have always been interconnected where the economy is dependent on society and the environment and human existence and society are dependent within the environment (Giddings, Hopwood & O'brien, 2002). Business and society comprise business ethics, corporate social performance, environmental protection, global corporate citizenship and stakeholder management theory (Schwartz & Carroll, 2008). But over a period of time, business impact on society has changed (Bhattacharyya, 2010). The main purpose of a business organisation is to serve and satisfy their customers (Haag, Cummings & Dawkins, 2000) and capture and retain monetary value (Thompson & Cats-Baril, 2003).

According by the World Economic Forum (2012), the context of business has changed dramatically in recent years: the influence of companies on society and on the planet has increased and companies' responsibilities have also changed. Laszlo (2001) stated that in a time when the values of the business world largely influence the values of society as a whole and the possibilities of future generations, the purpose and goals of business need to be questioned and expanded.

Pedersen (2010) stated that many researchers have tried to develop models that illustrate the responsibilities of business towards society. Freeman and McVea (2001) suggested that business has evolved over time from an emphasis on the traditional "profit-centred model" to an emphasis on the management of multiple stakeholders. This means that business as it existed in the past has evolved from simple entities, usually owner managed, to the larger more economical firms that we know at present. A different analysis of the evolution of

business was provided by Halal (2000) who observed that businesses have progressed from the traditional “profit-centred model” in the early 1900s to the “social responsibility model” in the late 1900s.

The roles and responsibilities of business in society, in particular global business, are being defined more broadly. For example, Post, Preston and Sachs (2002) stated that the legitimacy of the corporation as an institution, its “license to operate” within society, depends not only on its success in wealth creation but also on its ability to meet the expectations of diverse constituents that contribute to its existence and success. Post *et al.* (2002) defined these constituencies and interests as the corporation's stakeholders. Stakeholder demands are increasingly going beyond the obligation to “do no harm” to the responsibility of being “a positive force” in contributing to worldwide social development goals (Warhurst, 2005). Subsequently, the corporation must be seen as a body engaged in mobilising resources to create wealth and benefits for all its stakeholders and pursue socially responsible objectives without interfering with efficient resource allocation (Post *et al.*, 2002; Castelo Branco & Lima Rodriques, 2007; Werther Jr & Chandler, 2010).

As stated earlier, there has been a general shift in relation to the perceived role of business in society over the years (Pinkston & Carroll, 1996). At a minimum, society has continued to expect the business community to support and enhance the ethical behaviour of individuals within the community. Interest in the topic has been promoted by increased sensitivity issues such as damage to the environment, improper treatment of workers, and faulty production leading to consumer inconvenience or danger (Hillman & Keim, 2001). But, in addition, corporations have experienced increasing demands by society too and hence they have been under pressure to be more accountable to a wider range of stakeholders rather than just to the owners and shareholders, as has been the case in the past (Adams & Zutshi, 2004; Payne, 2006). Along with numerous studies (Gaddefors & Cronsell, 2009; Pies, Hielscher & Beckmann, 2009; Bhattacharyya, 2010), a wide range of stakeholders have come to expect more of business.

Internal communication happens constantly amongst stakeholders of an organisation and includes work-related communication as well as informal social chat. Understanding stakeholders is important as it helps to ensure that internal corporate communication

meets stakeholders' needs as there is always a danger that internal corporate communication might be seen as contributing to information overload (Welch & Jackson, 2007).

Communication and information play a strategic role within business environments especially amongst information workers (Ingenium Communications, 2012). Effective communication supports the development of positive relationships with the stakeholder community and can also be utilised to influence attitudes and behaviours within the wider environment (McDonald & Hammer, 2006). Therefore, since the engagement of stakeholders in business is crucial both in terms of communication and strategy, the first step will be to understand and define the stakeholders.

2.3.1 Defining stakeholders

Stakeholders are generally defined as any individual or organisation who has the ability to directly or indirectly affect or be affected by the operations and achievement of an organisation's goal (Freeman (1984) cited in Sweeney & Coughlan, 2008). The word 'stakeholder' is now well-known in public and non-profit management theory and practice, and especially after the definition by Freeman (1984) which states that stakeholders refer to persons, groups or organisations that must somehow be taken into account by leaders, managers and front-line staff (Bryson, 2004). Bhattacharyya (2010) defined stakeholders as those individuals and institutions that are influenced by the firms' actions or inactions covering the past, the present and the future. Examples of stakeholder groups (beyond stockholders) are employees, suppliers, customers, creditors, competitors, governments, communities, resource providers, alliance partners, and social and political actors (Goodpaster, 1991; Post *et al.*, 2002).

The concept of a stakeholder has become widely used as a tool for strategic management. Langtry (1994) stated that if one wants to be an effective manager then one must take stakeholders, as well as stockholders, into account. Freeman (2004) argued that the group of stakeholders external to the organisation have the ability to affect the organisation. The importance of relationships with these organisations supports the need for a new stakeholder approach to strategic management.

2.3.2 Analysing the stakeholders

The survival and success of an enterprise ultimately depends upon its mutual interactions with its network of stakeholders as this relationship generates long-term competitive advantages for the firm as well as for society (Sachs, Post & Preston, 2002). A strategic element of supporting and embedding any project in the organisation is to communicate with stakeholders effectively and to engage them with a project as early as possible (Chatterton, 2010).

But, increasingly, multinational corporations cannot know in advance the knowledge that is required for competing successfully. The knowledge needed to generate unique and disruptive ideas often lies outside the organisation with the external stakeholders (Hart & Sharma, 2004). Stakeholder theory is widely used in strategic management – for managers to be effective, they have to take stakeholders as well as stockholders into account (Langtry, 1994). Furthermore, according to Boatright (2006), management has a fiduciary duty to serve shareholder interests over and above the objective of a firm's shareholder wealth maximisation.

In different and conflicting ways, stakeholders affect and are affected by an organisation's strategies (Fred, 2011). For instance, the general public is especially interested in social responsibility, whereas stockholders are more interested in profitability. According to Khan (2012), business strategy can only be successfully implemented and aligned when firstly, high quality and breadth of information is available and secondly, for the organisation to effectively use the available information. Therefore, a crucial element to a successful business is to communicate with stakeholders effectively and to engage them with the strategic plan for the business as early as possible (Roper & Davies, 2007; Johnson, Scholes & Whittington, 2008).

One popular approach to improving organisational and professional practice is by improving communication amongst the stakeholders. This includes such diverse areas as corporate communication, health communication, public relations, employee communication, stakeholder communication, and the communication of change, among others (Seeger, 2006). Therefore, designing deliberate stakeholder communication approaches that align with organisational objectives is vital (Ingenium Communications, 2012).

With an understanding of the fundamental concepts, stated above regarding the role of business, its associated stakeholders, business strategy and business communication, the next section explores business strategy.

2.4 BUSINESS AND STRATEGY

Nowadays, there are many different definitions of strategy in practice and literature from different authors. A widely and commonly accepted definition of strategy within existing literature and industry is as follows: strategy can be described as the direction and scope of an organisation over the long term, which achieves an advantage in a changing environment through its configuration of resources and competences with the aim of fulfilling stakeholder expectations (Johnson *et al.*, 2008). Nickols (2008) said that strategy is a word with many meanings and all of them are relevant and useful to those who are charged with setting strategy for their corporations, businesses, or organisations.

Various terms are used in relation to strategy, so the ensuing sections will clarify some of these. Before describing the common terms, strategic planning needs to be explained.

2.4.1 Strategic planning

Strategic planning can be viewed as a process of developing and maintaining a strategic fit between the mission of the organisation, the strengths and weaknesses of the organisation, and opportunities and challenges in the organisation's external environment (Yankey, 1995). It attempts to predict the future environment and then independently develop plans for the firm to exploit its position (Freeman & McVea, 2001). Strategic planning emphasises the significance of making decisions which enable an organisation to successfully respond to changes in the environment (Vu & McIntyre-Mills, 2008).

The strategic planning process focuses executives on the strategy and future moves that the company will take to achieve its health and growth (Hodes, 2013). This can be achieved by meeting the mandates, fulfilling the mission or completing a set of crucial activities which should develop in producing fundamental decisions and actions that guide the organisation, what it does, and why it does it (Freeman & McVea, 2001).

Some of the main benefits of strategic planning, as per Bryson (1988), can help government and organisations to think strategically, clarify future direction, solve major organisational problems, and deal effectively with rapidly changing circumstances.

One of the most important steps in strategic planning is the formulation of mission and vision statements (Ozdem, 2011). In order to fully understand the nature and role of strategy in business and communication, it is necessary to describe some of the common terms used in strategy literature and business.

2.4.2 The language of strategy

Mission and vision statements have been overwhelmingly accepted as an indispensable part of the strategic management process for organisations of all types including public sector, non-profit, private, multinational, small and medium scale enterprises. It is widely believed that mission and vision statements impact on strategy and most aspects of organisational performance (Darbi, 2012). Mission and vision statements are both communication tools representing the organisational image and uniqueness in terms of ownership, resources or environmental circumstances to both internal and external stakeholders (Lynch, 2006; Darbi, 2012). As clearly illustrated in Figure 2.2, the mission and vision statements and the strategy are clearly linked and aligned which enables clear communication to the stakeholders.

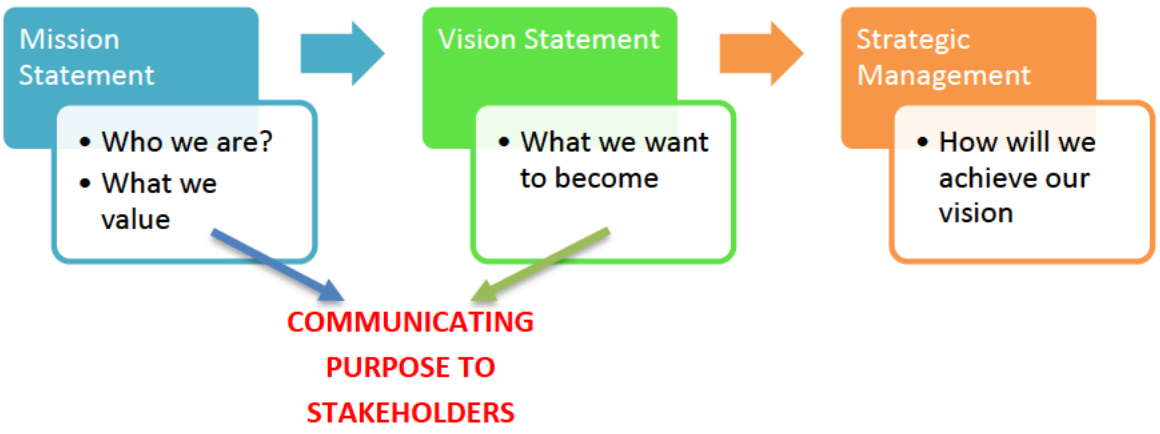

Figure 2.2: Key roles of mission and vision statements
Source: Open Text Book (2015)

The mission statement is a broad expression of the purpose of the organisation and plays a vital role in establishing direction that facilitates strategy formulation and provides the necessary framework against which the merit of organisational and functional goals and strategies can be assessed (Piercy & Morgan, 1994). A vision statement refers to the long-term objectives of the business (Ozdem, 2011). A mission statement is better used to communicate mission, a vision statement to articulate vision, and a values statement to describe core organisational values (Khalifa, 2012).

One of the main objectives of the mission and vision statements is communicating their purposes to stakeholders (Figure 2.2).

Once certain basic elements, such as mission, vision and goals are accepted, then formulation, implementation and evaluation of the strategy flow from these elements (Thibodeaux & Favilla, 1996). Strategic management is the execution of a strategy and actively plots a new direction for the firm and considers how the firm can affect the environment as well as how the environment may affect the firm (Freeman & McVea, 2001). Johnson (2004) added that strategic management comprises processes, not assignments or periodic events, and they are tied to an organisation's vision and departmental missions.

The study and exploration of strategic management is important in order to understand policy and strategic development within organisations (Jasper & Crossan, 2012). An increasing number of organisations are using strategic management to make effective decisions. But strategic management is not a guarantee for success as it can be dysfunctional if conducted haphazardly (Fred, 2011).

Examination and evaluation of the information through analysis are key to defining appropriate strategies and require skill, time and effort (Fleisher & Bensoussan, 2003). Fleisher and Bensoussan (2003) added that while most organisations gather some forms of competitive information, few formally analyse it and integrate the results into their business strategy.

With common strategy terms introduced and defined, the next section describes how strategy exists and co-exists at the hierarchical levels of organisations.

2.4.3 Levels of strategy

Strategy formulation, implementation, and evaluation activities exist at a number of hierarchical levels in an organisation (Johnson et al., 2008). The three most common levels for where strategic planning occurs are: corporate level, business level and strategic business unit (Ginsberg & Venkatraman, 1985; Mintzberg, Ahlstrand & Lampel, 1998). By fostering communication and interaction among managers and employees across hierarchical levels, strategic management helps a firm function as a competitive team (Fred, 2011).

It is important to note that all persons responsible for strategic planning at the various levels ideally participate and understand the strategies at the other organisational levels to help ensure coordination, facilitation and commitment, while avoiding inconsistency, inefficiency, and miscommunication (Fred, 2011).

It is important to understand the different level of strategy as with greater hierarchical distance between a subordinate and his boss makes it more difficult to share abstract and subjective information in decision making (Liberti & Mian, 2009).

These three most common hierarchies of strategy in an organisation are illustrated in Figure 2.3 and are described in this section, starting with the top level which is corporate-level strategy.

Figure 2.3: Levels of strategy
Source: Fred (2011)

Corporate-level strategy is concerned with broad decisions about the total organisation's scope and direction by considering the changes that should be made for growth objectives, the lines of business to compete and how these different businesses fit together (Mitchell, 2009).

Whereas corporate-level strategy deals with the question of what businesses to compete in, business-level strategy is concerned with how the organisation deploys its resources to compete successfully in each of the different lines of business (Nandakumar, Ghobadian & O'Regan, 2010).

Operational level strategy, which is also referred to as functional strategy, is at the operating end of an organisation (Beard & Dess, 1981). It focuses on maximisation of resource productivity within each function, for example marketing, research and development (R&D), and operations (Ginsberg & Venkatraman, 1985). Operational strategies are relatively short-term activities that each functional area within a company will perform to implement the longer-term corporate level and business level strategies (Mitchell, 2009).

Therefore, in summary, strategy making includes analysing and determining how core distinctive competencies are to be exploited as a business model through the process of adding value (Johnson *et al.*, 2008). After formulating a company's strategies, management must make designing organisation structure its next priority, for strategy is also implemented through organisation structure (Hill & Jones, 2008).

2.5 ORGANISATIONAL STRUCTURE

Schultz, Berkowitz and Loewenstein (2013) defined organisation structure as a framework around which a group is organised, the foundations which keep the group functioning, the operating manual that tells members how the organisation is put together and how it works. The authors added that organisational structure describes how members are accepted, how leadership is chosen, and how decisions are made. This description is supported by Robbins and Judge (2013), who outlined organisational structure as a construct to show how job tasks are formally divided, grouped, and coordinated. Hence, structure is not merely an organisation chart. Structure is all the people, positions,

procedures, processes, culture, technology and related elements that encompass the organisation.

The value creation activities of organisational members are meaningless unless some type of structure is used to assign people to tasks and link the activities of different people and functions (Hill & Jones, 2008). Structure makes possible the application of the process of management and creates a framework of order and command through which the activities of the organisation can be planned, organised, directed and controlled. The structure defines tasks and responsibilities, work roles and relationships, and channels of communication (Mullins, 2010).

Therefore, the effectiveness of the organisational structure will affect inter-personal and inter-departmental relationships, with appropriate structures aiding communication and efficient process flow. Ultimately, an organisation's structure will influence its competitive position (Evans & Richardson, 2008).

Furthermore, the organisation must also decide on the best way to organise its management hierarchy or chain of command (Emmerson, 2007).

2.5.1 Levels of organisation

Organisations are layered. The determination of policy and decision-making, the execution of work, and the exercise of authority and responsibility are carried out by different people at varying levels of seniority throughout the organisation structure. In small organisations, these activities tend to be less distinct, but in the larger organisations it is possible to look at organisations in terms of three broad interrelated levels in the hierarchical structure: the technical level, the managerial level and the community level. These last two levels are often referred to as middle management and senior management (Mullins, 2010).

Organisational structure offers options for administrators when choosing their team members or resources. Under different structures, administrators may employ divergent management methods and resources in an attempt to reach organisational goals (Chang, Tsai & Tsai, 2011). Azriel (1999) classified organisational structure as simple, functional, multi divisional and strategic business units (Table 2.1).

Table 2.1: Organisational structure

Types of organisational structure	
Simple structure	An organisational form in which the owner-manager makes all major decisions directly and monitors all activities, while the staff serves as an extension of the manager's supervisory authority (Madsen, 1996; Azriel, 1999)
Functional structure	Consists of a chief executive officer and limited corporate staff, with functional line managers in dominant organisational areas such as production, accounting, marketing, R&D, engineering, and human resources.
Multidivisional (M-Form) structure	Composed of operating divisions where each division represents a separate business or profit centre and the top corporate officer must delegate responsibility for day-to-day operations and business-unit strategy to division managers.
Strategic business unit (SBU) form	A form of the multidivisional structure consists of at least three levels, with the top level being the corporate headquarters; the next level, SBU groups; and the final level, divisions group by relatedness (either product or geographical market) within each SBU.

Source: Azriel (1999)

Schultz *et al.* (2013) synopsised the reasons for developing organisational structure as follows:

- Structure gives members clear guidelines for how to proceed. A clearly-established structure gives the group a means to maintain order and resolve disagreements.
- Structure binds members together. It gives meaning and identity to the people who join the group, as well as to the group itself.
- Structure in any organisation is inevitable. An organisation, by definition, implies a structure. Your group is going to have some structure whether it chooses to or not. It might as well be the structure which best matches up with what kind of organisation you have, what kind of people are in it, and what you see yourself doing.

Furthermore, with a multidivisional company, that is, a company that competes in several different businesses, there is a requirement for different managers to manage and control the different departments (Hill & Jones, 2008).

Figure 2.4 shows the organisation of a multidivisional company with three levels of management: corporate, business, and functional.

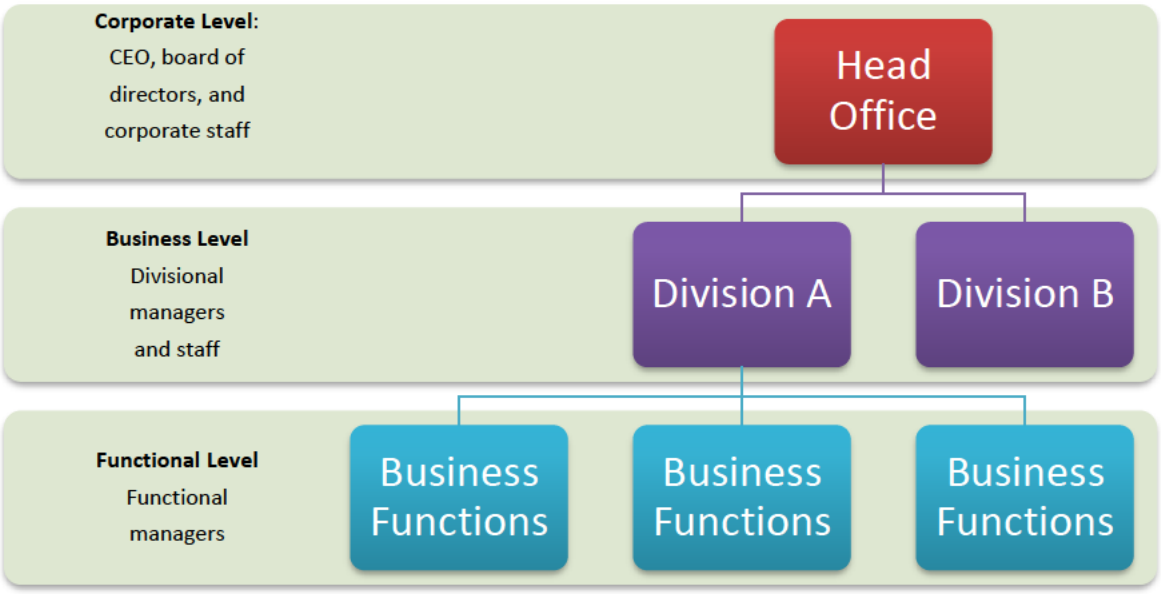

Figure 2.4: Levels of management
Source: Hill & Jones (2008)

Chief executive officers (CEOs) and directors are situated at the first level of the hierarchy and are responsible for the performance of all departments and establish organisational goals, such as which goods and services the company should produce (Meyer, Ashleigh, Jones & George, 2007; Hill & Jones, 2008). At the base of the managerial hierarchy are functional managers, often called first-line managers or supervisors. They are responsible for daily supervision of the non-managerial employees who perform the specific activities necessary to produce goods and services (Meyer *et al.*, 2007). Example of functional managers include the supervisor of a work team at a construction site, the head nurse in the maternity ward of a hospital, and the chief bookkeeper in the accounting division of a logistics company.

Organisational structure is vitally important, since it needs to support strategic objectives in a dynamic, changing environment (Richardson & Evans, 2007). There is also need for a continual review of structure to ensure that it is the most appropriate form for the particular organisation, and in keeping with its growth and development (Mullins, 2005). One of the current trends in business circles is restructuring business processes and

transforming organisations' shape, size and structure. For example, a large organisation will also have an information technology functional division that is responsible for supporting all information technology requirements across all its divisions (Laudon & Laudon, 2012).

Information technology (IT) is becoming core to business success because it directly affects the mechanisms through which they create and capture value to earn a profit: IT is thus integral to a firm's business-level strategy (Drnevich & Croson, 2013). The impact of information technology has significant effects on the structure, management and functioning of most organisations (Mullins, 2010). On the flip side, Mukherji (2002) believes that these organisational changes were made possible by the support provided by information technology that allowed autonomy and distribution of responsibility. For example, using IT made it easier for organisations to shift from a centralised to decentralised system and vice versa (Mukherji, 2002). In the judicial system, some countries are looking at using video links between jail and courts where the trial of the prisoners can be done without physical appearance in the court. Thus, IT also facilitates the change in the judicial system by not only providing solutions for better case management, but also solves issues of security and safety of prisoners while transporting them from jail to court (Nasir, 2007).

The interaction between information technology and organisations is complex and is influenced by features such as an organisation's structure, business processes, politics, culture, surrounding environment, and management decisions (Laudon & Laudon, 2006). Since information is the basis for all activities in an organisation, there must be systems that generate, manage and provide correct and reliable information in needed times and in the useful forms (Mortezaei, 2012). Such systems have been named information systems. Furthermore, organisations have recognised IT as a strategic resource (Roberts, Galluch, Dinger & Grover, 2012).

The exploration of information technology and information systems will help in explaining the importance of information in the organisation.

2.6 INFORMATION SYSTEMS AND INFORMATION TECHNOLOGY

In recent years, the success of enterprises has been directly linked to the level and quality of information that is being used in the company and its ability to use that information correctly (Lipaj & Davidaviciene, 2013). Since the mid-20th century, the emergence of information technologies has dramatically transformed the way information is disseminated and consumed in organisations (Hemmer, Heinzl & Leidner, 2014).

Information technology and information systems are not the same. Information technology represents one component of an information system (Thompson & Cats-Baril, 2003).

2.6.1 Information technology

Information technology (IT) is a term that is used to cover a broad spectrum of computing and communication devices all sharing some common features (Thompson & Cats-Baril, 2003). Figure 2.5 illustrates a typical information system with the interrelated elements or components that collect (input), manipulate (process) and store, and disseminate (output).

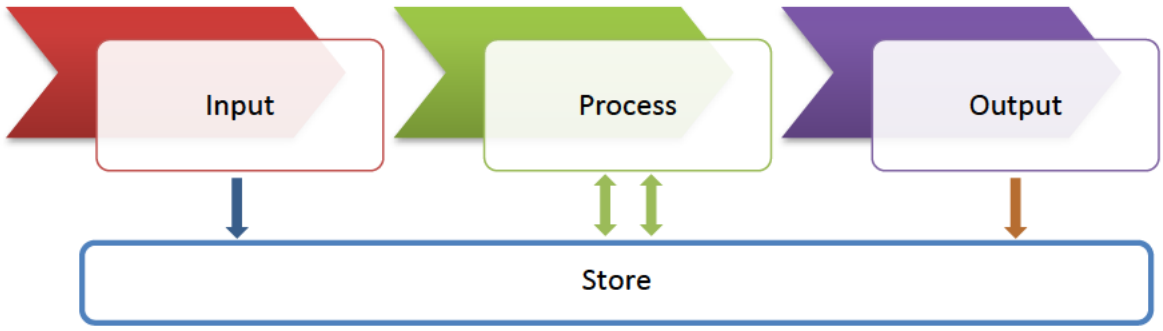

Figure 2.5: Common features of information technologies
Source: Stair & Reynolds (2006)

All information technologies have the ability to capture data which is commonly known as input, process and convert these data, store them and lastly present the data which is generally known as output.

Mohsenzadeh and Isfandyari-Moghaddam (2009) surveyed literature on information technology and defined information technology as encompassing computers, databases

whether off-line or on-line, information networks like internet and intranet, e-resources including e-books, e-journals, e-dissertations, and software and hardware equipment.

Dramatic changes in information technology have taken place in recent years. Personal computers, mobile phones, artificial intelligence, virtual reality, very large databases and multiple social networking sites are a few examples of how information is used differently as a result of technological developments (Volberda, Morgan, Reinmoeller, Hitt, Ireland & Hoskisson, 2011). Technology touches some part of nearly every product or service pulsing through the economy, weaving the industrialised and developing world together as never before (Nash, 2012).

Organisations have made huge investments in information technology over the last 25 years, resulting in many, if not most, intra-organisational work systems being IT-enabled (Jasperson, Carter & Zmud, 2005). The authors further added that, organisations are increasingly depending on IT-enabled inter-organisational value chains as the backbone of their commerce with clients, customers, suppliers, and partners.

Sacks, McAuley and Waddington (1997) suggested that one of the strategic needs of the organisation is to have processes that educate management in the capability of the technical infrastructure and its adaptability. Furthermore, the authors recommended that strongly business-focused IS/IT professionals with equally suitable knowledge of the business are needed to work at both operational and strategic levels. To effectively capitalise on these technologies, many organisations are establishing two new positions in their firms: chief information officers (CIOs) and chief technology officers (CTOs). This trend signifies the growing significance of IT in businesses (Fred, 2011).

Fred (2011) added that a CIO and CTO should work together to ensure that information needed to formulate, implement, and evaluate strategies is available where and when it is needed. They are both responsible for developing, maintaining, and updating a company's information database.

2.6.1.1 The chief information officer

The chief information officer (CIO) is more a manager, managing the firm's relationship with stakeholders. Ever since the introduction of the role of CIO in major companies (1970s), the CIO's role has evolved to reflect both the firm's infrastructure and strategy (Ross & Feeny, 1999; Chun & Mooney, 2009). The literature of the past three decades shows that the typical characteristics of CIOs have been quoted and related with many economic and managerial factors (Maditinos, Sevic & Kokkinos, 2010).

The CIO is responsible for all traditional computer services, internet technology, telecommunications network services, and other IS technology support services (O'Brien & Marakas, 2010). Figure 2.6 summarises the main roles required for the CIO to meet their strategic responsibilities.

Figure 2.6: Roles of the CIO
Source: Ross & Feeny (1999), Chun & Mooney (2009) and Nash (2012)

In terms of the above roles of the CIO, it means than the responsibilities of the CIO are varied and wide in scope. Laplante and Bain (2005) identified five primary CIO roles: business strategist, IT strategist, change agent, technology advocate, and functional leader.

Having a CIO is not always a good idea, as pointed out by Lundquist (2008). As most current CIOs are technologists, the tendency is to embrace an innovative technology and then wait for the business world to catch up with the possibilities instead of putting business first and technology second. This is a departure from O'Brien and Marakas (2010) who believe that sometimes the CIO is an executive from the business functions or units outside the IS/IT field.

Since the CIO roles are increasingly moving toward business management, the oversight supervision of technical areas is sometimes being handed over to a chief technology officer (CTO) (Anthes, 2000).

2.6.1.2 Chief technology officer

The chief technology officer (CTO) is usually the highest-ranking technology manager in the organisation with the responsibility of oversight and prioritisation of the research and development activities (Medcof & Yousofpourfard, 2006; Hartley, 2011). A CTO can be described as a businessperson who measures innovation, research and experimentation by the contribution they make to a company’s revenues and future competitive advantage (Smith, 2007).

Figure 2.7 illustrates some of the primary responsibilities of a CTO which may vary amongst organisations.

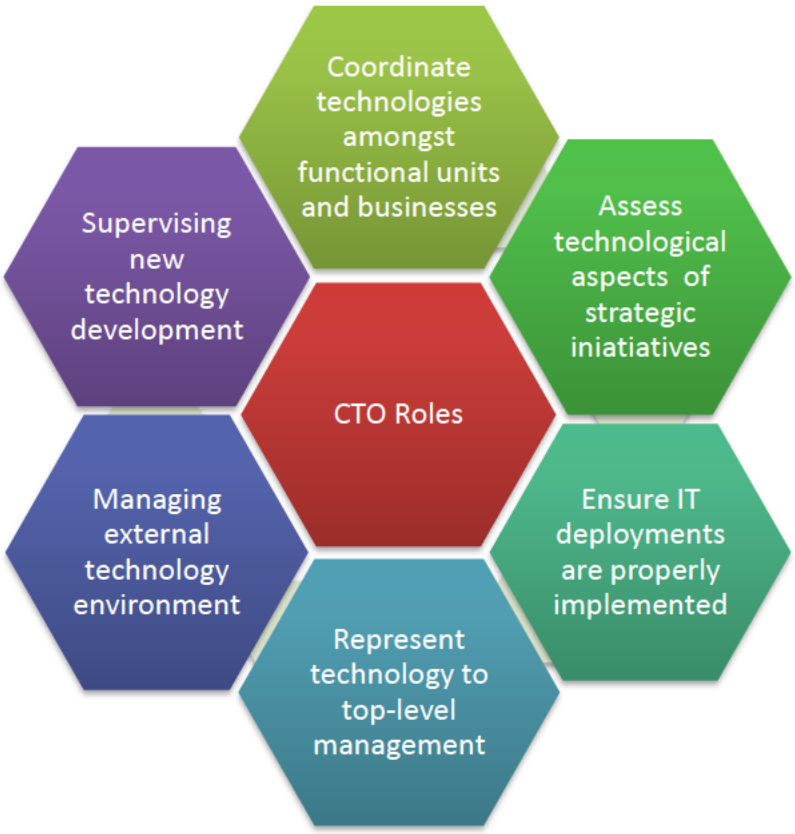

Figure 2.7: Roles of the CTO
Source: Anthes (2000), Hartley (2011) and Rouse (2012)

It is evident from Figure 2.7 that the CTO has several unique roles and responsibilities that explain the importance of the position. The CTO must be able help other senior management to understand technology issues and communicate effectively with regard to technology and strategy (Hartley, 2011). The CTO is also responsible for communicating the company's technology strategy to partners, management, investors and employees (Rouse, 2013).

Smith (2007) identified five distinct patterns of the CTO behaviour based on their backgrounds, responsibilities and missions: genius, director, executive, advocate, administrator and void (Figure 2.8).

Figure 2.8: Categories of the professional responsibilities of CTOs
Source: Smith (2007)

Since the CTO position is frequently swappable with the CIO position and both are somewhat new executive positions, the role of the CTO is as diverse as the role of the CIO (Smith, 2007). The difference between the CIO and CTO can be concluded as follows:

- A CIO will focus on effectiveness and is responsible for ensuring that the company's information technology investments are aligned with its strategic business objectives.
- A CTO will focus on the management of current operations with an emphasis on efficiency. The CTO is responsible for designing and recommending the appropriate technology solutions to support the policies and directives issued by the CIO.

(Mullins & Klinowski, 2003; Shurville, Browne & Whitaker, 2010)

The CIO and CTO positions were created as information was increasingly being recognised as a critical resource that required active management, stewardship and oversight from a senior management perspective (Peppard, Edwards & Lambert, 2011). Hemmer *et al.* (2014) added that as organisations acknowledged the importance of information technology to support both operational and strategic goals of the firm, the position of CIO became critical to achieving business objectives.

2.6.1.3 The importance of IT

According to Farazmand, Moeini and Sohrabi (2005), IT is a vital resource in today's business environment, and successful businesses have invested heavily in IT. Mithas, Tafti, Bardhan and Goh (2012) showed that by strategically investing in IT contributes significantly to a firm's profitability. Additionally, IT directly affects the mechanisms through which firms create and capture value to earn a profit: IT is thus integral to a firm's business-level strategy as described by Drnevich and Croson (2013).

Dramatic changes in information technology have occurred in the past 20 years, such that information technology is no longer confined to the business community. For example, personal computers, mobile phones, artificial intelligence, virtual reality, and massive databases are a few examples of how information is used differently as a result of technological developments. An important outcome of these changes is that the ability to effectively and efficiently access and use information has become an important source of competitive advantage in virtually all industries. Information technology advances have given small firms more flexibility in competing with large firms, if that technology can be used with efficiency (Hitt, Ireland & Hoskisson, 2012). According to Haigh (2004), IT no longer provides the bonus to attract customers to a particular company; it is simply an essential tool for businesses that want to survive in the modern world.

Information technology, when used as part of an information system, can enable an organisation to monitor changes in customer preferences immediately, allowing it to react quickly, and increasing its flexibility and organisational responsiveness (Thompson & Cats-Baril, 2003).

2.6.2 Information systems

Davis (2000) defined an information system (IS) of an organisation as that which consists of the information technology infrastructure, application systems, and personnel that employ information technology to deliver information and communication services for transaction processing/operations and administration/management of an organisation (Davis, 2000). An information system entails at least four slightly separate, but related components as depicted in Figure 2.9.

Figure 2.9: Components of an information system
Source: Cornford & Shaikh (2013)

Pabedinskaitė (2010) suggested that the main function of an information system is to process (collect, transfer, store, process, and share) information. From a technical perspective, an information system is a continuous system that deals with collecting, processing, storing and distributing information to assist an organisation's decision making and control (Saeidi & Marzban, 2013). Lipaj and Davidaviciene (2013) added that an

information system enhances business processes and makes communication between users easier through the use of hardware, software and networks.

There have been multiple definitions of IS over the years, as confirmed by Alter (2008), who provided a table summarising 20 different definitions published between 1985 and 2007. Defining information systems has been a long-standing problem since it may not be possible to develop a universal definition but academics agree that the field of information systems is concerned with information and organisations, and for all practical purposes includes computers (Westfall, 2012).

For the last 20 years, diverse kinds of information systems have been developed for different purposes, depending on the needs of a business. Transaction processing systems (TPS) function at an operational level to process large amounts of data for routine business transactions of the organisation, office automation systems (OAS) support data workers, and knowledge work systems (KWS) support professional workers. Higher-level systems include management information systems (MIS) and decision support systems (DSS). Expert system (ES) applies the expertise of decision makers to solve specific, unstructured problems. At the strategic level of management, there are executive support systems (ESS). Group decision support systems (GDSS) and the more generally described computer supported collaborative work (CSCW) systems aid group level decision making of a semi-structured or unstructured decision (Asemi, Safari & Zavareh, 2011).

There are various different descriptions for an information system based on different perceptions; nevertheless, in all cases, they refer to the systems that are commonly grouped into the five categories illustrated in Figure 2.10.

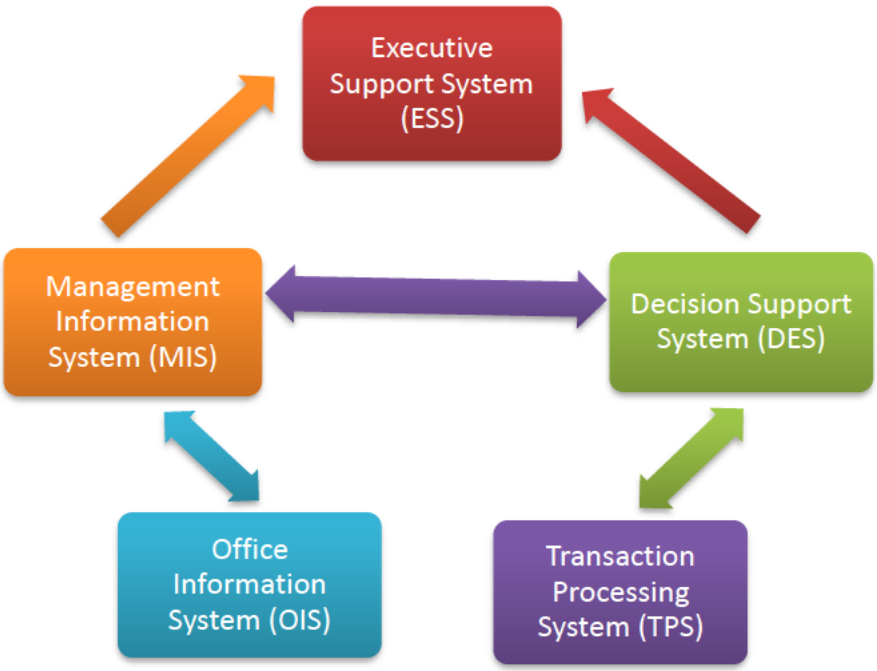

Figure 2.10: Classification of information systems
Source: Awais, Irfan, Bilal & Samin (2012)

These collections of systems are interrelated in terms of data and information flow. The arrows show the way information is transferred from one system to another; the diagram also represents the object of analysis in each category. Different descriptions are suggested in various scientific sources regarding the purpose, functionality and operational areas of the systems provided in Figure 2.10. The most relevant explanations of every system are provided below to gain a better understanding of the information systems and their influence on improvement of business performance.

2.6.2.1 Office information system

An office information system (OIS) is meant to support the office tasks of managers and professionals within a company through the use of hardware, software and networks (Law & Gorla, 1996). Mortezaei (2012) views an office automation system as an innovative method, on one hand it speeds the workflow, and on the other hand, with data collection of the activities of the organisation and classification of them, provides an appropriate

platform to accelerate everyday tasks. For example, in a retail shop, the shop might e-mail customers back orders as soon as a product arrives in the shop. In a manual system, the shop would have to contact each buyer via phone or send an e-mail when the products arrive in the shop.

Furthermore, the presence of an office information system has a major role in facilitating and accelerating the exchange of information within organisations, resulting in an increase in the communication channels and speed and ease of organisational transactions (Mortezaei, 2012). Using the same example about the back order for the shop, the use of e-mail enhanced the speed of communication between the shop and the customers.

2.6.2.2 Transaction processing system

A transaction processing system (TPS), according to Takahara, Liu, Chen and Yano (2005), is an information system designed to process day-to-day business event data at the operational level of an organisation. For example, a barcode scanner at retail point of sale, casinos and stadiums. These systems help in answering the routine questions of a business such as a good description of a bank account activity where TPS keeps track of all the services associated with a single account: deposits, withdrawals, transfers, fees and interest paid.

Batch and real-time systems are two types of approaches to transaction processing (Molla, Heeks & Boateng, 2003). In batch systems, data to be processed are collected for a period of time and then processed at some later specified date or time. In real-time systems, on the other hand, data are processed as soon as the transaction occurs.

2.6.2.3 Management information system

The purpose of a management information system (MIS) is to improve the performance of an enterprise by improving the quality of managerial decisions (Wessels, Grobbelaar, McGee & Prinsloo, 2005). An effective information system thus collects, codes, stores, synthesizes, and presents information in such a manner that it answers important operating and strategic questions, such as the following:

- Reports on the organisation's current performance which can be used to monitor and control the business and predict future performance (Laudon & Laudon, 2012)
- Produces reports summarised from transaction data, usually in one functional area, for example a report on total sales for each customer (Rainer & Cegielski, 2012)

The heart of an information system is a database containing the kinds of records and data important to managers (Fred, 2011). Alam (2014) added that management information systems can also compare strategic goals with practical decisions, giving managers a sense of how their decisions fit organisational strategy.

Lipaj and Davidaviciene (2013) explained that a management information system provides relevant and timely information that is used in the decision-making process and helps managers to plan and control efficient performance of operations. Sometimes, MIS does not provide exactly the information that is needed to solve problems for individual and group decision making – in these cases, decision support systems can be used which are tailored to the specific needs of the individual and groups (Alam, 2014).

2.6.2.4 Decision support system

A decision support system (DSS) is a class of information system that supports business and organisational decision-making activities (Chichernea, 2009). DSS simply means an interactive computer-based system that aids users in judgment and choice activities where the quality of decisions is important (Druzdzel & Flynn, 2009). Nowduri (2011) stated that a DSS is an information system that helps users to analyse information, which is helpful for their business, and presents it in a way suitable for decision making. This helps to make decisions in a more efficient way.

Usually the DSS is used by all levels of people within a business organisation. Top-level management uses DSS for strategic decisions and middle management uses it for tactical decisions, while first line supervisors deploy it for day-to-day operational decisions (Druzdzel & Flynn, 2009; Alam, 2014).

2.6.2.5 Executive support system

Executive support system (ESS) is a reporting software tool that processes an organisation's data into useful summarised reports generally used by executive level managers for long-term planning and scheduling (Chichernea, 2009). The ESS may get input from the TPS of an organisation and from other sources and present the information in formats that may be useful to the senior management to take effective decisions (Mishra, 2013).

The five most common information systems, OIS, TPS, MIS, DSS and ESS have been outlined with some differences and some overlapping. Forgionne, Mora, Gupta and Gelman (2005) stated that individually these different information systems or sometimes a combination of them have yielded substantial benefits in businesses.

The significance of information systems (IS) has increased exponentially from the past decade with the implementation of IS by a growing number of businesses (Davidavičiene, 2008; Paliulis & Uturytė-Vrubliauskienė, 2012). A modern organisation could not be imagined without an efficient information system. For example, as markets become more competitive, the ability to react swiftly and decisively is more vital. Therefore, selecting, developing and implementing decision support systems, executive support systems to support the business are also crucial (Chichernea, 2009). Gaines, Hoover, Foxx, Matuszek and Morrison (2012) added that properly implemented information systems have become an even more valuable strategic resource which organisations can use to improve their competitive advantage.

2.6.3 IS, IT, strategy and organisation structures

Lipaj and Davidaviciene (2013) believe that from previous research, no doubts were left that implementation of an information system in an organisation could bring a lot of benefits in dealing with internal and external tasks that a company might face in day-to-day operations and long-term decision making. In addition, Mishra and Mishra (2013) reported that stakeholders are also seen as the means to more successful information and communication technologies, and information system development and implementation issues. For example, involving a wider range of stakeholders such as end users, managers

and customers is very important towards successful inter-organisation information system implementation which usually involves strategic decisions (Mishra & Mishra, 2013).

The business value of information technology has long been identified as one of the key topics for information systems as Wang, Liang, Zhong, Xue and Xiao (2012b) pointed out that there is a positive relationship between IT and a firm's performance where IT creates business value. Information technologies are becoming an inseparable part of a competitive business strategy (Pabedinskaitė, 2010). Information technology is integral to a firm's business-level strategy as IT directly affects the mechanisms through which businesses capture value to earn a profit (Drnevich & Croson, 2013). However, with the rapidly changing business environment and continuously evolving IT, organisations have yet to learn how to develop an effective IT strategy (Smith, McKeen & Singh, 2007).

Smith *et al.* (2007) reported from past studies that the lack of alignment between IT and business strategies is one of the main reasons why businesses fail to realise the full potential of their IT investments and conversely, firms that achieve a high degree of alignment are often associated with better overall business performance. In studies on the impact of information technology on business management, the term strategic alignment is often used. Strategic alignment is a key management theory that means that strategy must align with business structure and information technology (Pankratz, 1991). Ideally, IT and business strategies should complement and support each other relative to the business environment. Strategy development should be a two-way process between IT and business (Schultz *et al.*, 2013).

It not always easy to align IT with business, as reported by Hu and Huang (2006). This is because many IT decisions are driven by business executives who know little about technology (Jahnke, 2004), the lack of executive sponsorship (Stanleigh, 2005), and the differences of expectations between business units and the failure of these units to work as partners towards common goals (Dissanayake, 2012).

Information systems and organisation structures have been highly interconnected with each other (Mukherji, 2002). For example, an enterprise resource planning (ERP) system can support virtually all areas of an organisation, across business units, departmental functions and plants by integrating working practices and individual information systems

(Yusuf, Gunasekaran & Abthorpe, 2004). Gelinas, Sutton and Fedorowicz (2004) proposed that IS can also affect organisational structures in terms of job functions, realignment of duties, reporting responsibilities and the behaviour of employees and customers. Furthermore, an organisation's ability to use IT to support its core competencies is dependent on IS functional capabilities, which in turn are dependent on the nature of human, technology, and relationship resources of the IS department (Ravichandran, Lertwongsatien & Lertwongsatien, 2005).

Over the years, information systems architecture as well as organisation structures have evolved from centralised to more decentralised forms (Mukherji, 2002). This is supported by Mullins (2010, p. 604) who stated that information technology may influence the centralisation/decentralisation of decision-making and control systems. He also suggested that there are logical linkages between information system architectures and their "fit" with certain organisation structures and strategies. For example, the continual improvements of information technology in global telecommunications are giving international firms more flexibility to shape their global strategies (Laudon & Laudon, 2012).

Johnson *et al.* (2008) added that information and information systems have an influence on creating and destroying the capabilities of an organisation and likewise, its competitive advantage. This is because information and IT impact on three core capabilities of an organisation: (1) ensuring that products/services are valued by customers, (2) outperforming competitors, and (3) making capabilities difficult to imitate (Johnson *et al.*, 2008).

Glazer (1993) suggested that firms that successfully integrate IT strategy with their business strategies do so by focusing on the information itself as the real carrier of value and source of competitive advantage, rather than on the technology. Hence, the next section describes the role of information in the organisation.

2.7 ROLE OF INFORMATION IN ORGANISATIONS

The decreasing cost of obtaining, processing, and transmitting information is revolutionising the way we do business. As stated by Porter and Millar (1985), the falling

cost and growing capacity of new technology has resulted in many industries moving towards a higher information content in both product and process. For example, electronic-messaging systems, such as e-mail, have become the communication medium of choice in many organisations, and hold significant and valuable business data, information and knowledge. These systems have had a profound impact on the way personal and business communications are effected in the office (Burger & Rensleigh, 2007). The key role of information is to allow a business to make informed decisions by presenting data in a way that can be interpreted by management. Further, businesses and governments are trying to make information available in the right form to the right user both at the personal and organisational levels (Ogbomo & Ogbomo, 2008).

2.7.1 Business communications

Communication is the passing on of ideas and information. Organisations need good, clear communication in order for business to be conducted effectively. The contact may be between people, organisations or places and can be in various different forms, such as speech, writing, actions and gestures. Organisations need to be structured in such a way as to maximise the benefits of communication processes (The Times 100, 2013).

The strategic role of communication is becoming a managerial priority in organisations as much as it influences value creation (Lindberg-Repo & Grönroos, 2004). For example, in this current information age, customers are empowered to participate in shared communication and have greater claims in their transactions and relationships with businesses. Lindberg-Repo and Grönroos (2004) added that these empowered, demanding, and communications engaged customers are ready to switch to another service provider if their relationship is not enhanced through continuous value creation.

Advancing this concept of communication relationships between customers and businesses, Borghini and Rinallo (2003) suggested that managers should develop communication processes focusing on communicating the set of resources and capabilities that can create added value for a customer. Consequently, according to Klanac (2005), companies need to understand that the same type of communication cannot be implemented with all customers. Rather, they need to consider what the relationship with

the customer is and adjust the means of communication accordingly. For example, in the early stage of customer and business relation, internet communication should focus on providing relevant information to the customers and towards initiating bilateral communication. During the later stage when commitment between parties has increased, the relationship demands a more advanced forms of communication, such as electronic data interchange (EDI), extranet, interactive and password-protected websites and encrypted documents (Klanac, 2005).

On the basis of an extensive review of literature on the importance of information and communication in businesses, Huhtinen and Virolainen (2002) found that the role of communication is very crucial from the organisational viewpoint as the communication and cooperation between diverse participants have been recognised as crucial elements to maintain organisational stability and adapt to change. Likewise, the study of Klanac (2005) builds on previous research to show that a crucial condition for an effective operation of business relationships is the importance of good communication between actors, especially today in the age of globalisation and internationalisation of businesses. However, Forman and Argenti (2005) justifiably added that albeit an entire discipline is devoted to the study of organisational strategy, including strategy implementation, barely any attention has been given to the connections between information, communication and strategy.

Anyway, Forman and Argenti (2005) also noted that since 1995, business communication researchers have become increasingly interested in the contribution of corporate communication to a company's ability to create and disseminate its strategy.

2.7.2 Information and decision making

Information is crucial to decision making, and hence its value is strongly bound to the decisions that are the outcome from its use. For example, in business ventures, rational decision making is challenging if all the necessary information is not available on time (Busenitz & Barney, 1997 1816). Lessing and Scheepers (2004) stated that communicating information to decision makers is a crucial function of the organisation.

The first step in decision making is called the intelligence stage which encompasses collection, classification, processing, and presentation of information relating to the

organisation and its environment (Ramesh Babu, Singh & Sachdeva, 1998). The decision-making process can also be defined as a group of people (decision makers, agents, actors) trying to agree on the correct actions to achieve goals using information based on the results of past events (Kidane, 2012). For example, the study of Citroen (2011) on decision makers in Germany and Netherlands confirms that the crucial value of information in decision-making. The author found that the decision-making process often commenced under uncertain conditions that evolved into more certainty when sufficient relevant and reliable information had been gathered. Delivering the available information to decision makers in a timely manner in an appropriate format is also crucial as the decision maker must trust the information source and communication medium (Kennerley & Mason, 2008). Building on these descriptions, it is clear that for decision makers to make a significant contribution to the decision process, they require information to understand the business and use good communication and influencing skills (Kidane, 2012).

Decision-making groups in organisations are frequently required to act as a "think tank" and to perform ''reality testing'' to reach the best alternative (Schulz-Hardt, Jochims & Frey, 2002). It has long been recognised that the effectiveness of decision making is influenced by many factors. Among these are the time available before the decision must be rendered, the experience of the decision maker, and the quality of the data needed for the decision (Fisher, Chengalur-Smith & Ballou, 2003).

To improve the quality of decision making and the time required to make decisions, Paul and Nazareth (2010) recommended enhancing the information acquisition process. Although ideally the data used should be of high quality, in practice this is often not the case, for reasons that range from the cost of obtaining quality data to the inherent difficulty or even impossibility of doing so for certain data types (Fisher *et al.*, 2003). Kennerley and Mason (2008) argued that if decision making is to be informed by information then clearly it is important what data are available. Not only does the availability of information enable a decision to be made, but in many situations data can indicate when a decision needs to be made. For instance, to inform their decisions, decision makers often need to wait for the interpretation or analysis of data rather than just the data, because they do not have the time and/or expertise to do their own data analysis (Hogan, 2005).

A rational approach to decision-making does not by itself imply that every morsel of information must be located, accessed, retrieved, analysed and utilised before a decision can be reached as there are limits to the amount of information that can be collected in a rational decision-making process (Citroen, 2011). For instance, due to time and resource limitations, it may not be practically possible to analyse all available information and consider all possible alternatives before making a decision. Despite these restrictions, a decision often has to be attained by certain time.

The frequency and detail of information as well as an appropriate analysis of the costs of various products and services contribute significantly to business efficiency and a reduction of losses (Ivankovic, 2005). Ivankovic (2005) explained that information on changes of customer satisfaction, characteristics and the economic situation influences decisions on the type and time of introducing a new product, service or price.

According to Fisher *et al.* (2003), the quality of information is important as this indeed influences the decisions to be made. The authors also found differences in the amount of influence which is based on factors such as complexity of task, decision strategy, and format of the available information. For example, performance measurement information is useful as long as management is satisfied with the information and it is supplied on time (Ivankovič, Jankovič & Peršič, 2010).

The empirical analysis of literature from 1996 to 2000 by Peng and Litteljohn (2001) shows that communication is pervasive in every aspect of strategy implementation and decision making. For example, upward communication improves decision making in organisations and if not practised, senior management teams become out of touch with their employees and customers and underestimate or miss emerging problems in their organisation or marketplace. They are more likely to produce strategies that are misaligned with the perceptions of their employees (Tourish, 2005). Decisions are based on the information available to decision makers (Ivankovič *et al.*, 2010). Furthermore, sourcing relevant and accurate information ensures that the decision-making process embodies all aspects of the business and anticipates future trends (Naicker, 2012).

Organisations also need to ensure that their information-processing systems are properly integrated, and that the necessary information is flowing in from the environment and

being supplied to the right people in the organisation. For instance, information on matters such as competition, markets, technologies and trends in the societal environment affecting the organisation is used as a basis for judgement on the implications of feasible alternatives for a decision to be made (Citroen, 2011). Thus, it is important to understand the sources of information in the business environment.

2.7.3 Information and the business environment

The environment is what gives organisations their means of survival (Johnson *et al.*, 2008). If organisations are unable to import energy and resources from the environment, or if their products or services are not required by the environment, then they cannot survive (Meinhard, 2008). Farahmand (2013) added that implementing good environmental and organisational practices is good for organisational survival as it can give a competitive advantage.

Conversely, the environment is also a source of threats, such as political risk (Jiménez, Luis-Rico & Benito-Osorio, 2013), unorganised organisations (Macpherson, 2012), hostile environments (Lawton, Rajwani & Reinmoeller, 2012) and lack of understanding of technologies by suppliers and buyers (Leek, Turnbull & Naudé, 2003). For example, Eastman Kodak, the company that concentrates on photography almost went out of business with the introduction of digital cameras and smartphones, in contrast to its rival company, Fuji, who is striving (Lappin, 2012; Usborne, 2012). Kodak's middle managers, culture and rigid, bureaucratic structure hindered a fast response to new technology which dramatically changed the process of capturing and sharing images and moreover did not listen to the innovators within who believed that digitisation was going to eventually destroy the film business (Lucas Jr & Goh, 2009; Usborne, 2012). Nonetheless, organisations have learnt to analyse their environment, define their position, develop competitive and corporate advantage, and better understand how to sustain advantage in the face of competitive challenges and threats to achieve and to exceed performance objectives (Casadesus-Masanell & Ricart, 2010). Since the environment is a potentially useful source of information, organisations are working hard to listen to their customers and watch their competitors closely. For example, information garnered during the sales process can be crucial in designing (or redesigning) a product (Onyemah, Pesquera & Ali,

2013). Information gathered on the competencies of suppliers can be more important than the product characteristics (Borghini & Rinallo, 2003).

Since the development of communication and collaboration technologies, one of the key forces sculpting the business environment has been the information technology revolution (Leek *et al.*, 2003). For instance, sustainable development can be achieved by IT technologies such as digitisation of information, dematerialisation of transport (e.g. flights to teleconferencing), and reduction of office spaces (Yi & Thomas, 2007). IT has also added new models to the business environment such as e-business that increases the efficiency of information flow, both within the business and with external sources (Papageorgiou & de Bruyn, 2011).

IT has helped managers in decision making by making information more easily and readily available. For example, information that is relevant to strategic decisions consists of such items such as internal organisation, market structures, competitors, customers' attitudes, technologies, regulations and public affairs, which are easily and timeously available due to technology (Citroen, 2011).

The diverse uses of information and the increased sharing of information that has arisen in the business environment as a result of the widespread introduction of IT has brought a new dimension to the characteristics of the quality of information (Fisher *et al.*, 2003).

The literature shows that it has long been recognised that data is best expressed or studied through multiple attributes or dimensions. Fisher *et al.* (2003) investigated information quality in terms of accuracy, timeliness, completeness, consistency and relevance from the perspective of the decision maker and found that accuracy and timeliness were the most important. Additionally, Price and Shanks (2004) stated that quality information and information quality management in an organisation are both crucial for effective operations and decision making (Price & Shanks, 2004). For instance, information on matters such as competition, markets, technologies and trends in the societal environment affecting the organisation is used as a basis for decision making (Citroen, 2011). As information quality is an information component of any organisation, the next section discusses information quality with respect to the organisation.

2.7.4 Information quality

Information quality is widely and generally defined in academic literature and industry as information that is “fit for use” (Liu & Chi, 2002; Fehrenbacher & Helfert, 2008), and fulfils the purpose that it is envisioned for (Kahn, Strong & Wang, 2002). Decision makers use information based on diverse kinds or categories of data. Decision is based on information and if the information or its communication is of poor quality then the decision is most likely to be flawed (Fisher & Kingma, 2001). Building on this, Gelman (2010) found that there is a direct relationship between data accuracy and the resulting decision accuracy. Citroen (2011) stated that correct strategic decisions could only be taken on correct, complete, checked, reliable, robust and relevance rated information. For instance, when reliable data on the performance of competitors and market conditions are available, decisions by executives are easier as they have the assurance that they could judge the consequences of their actions more comfortably and rationally (Citroen, 2011).

Unfortunately, data can possess a variety of deficiencies, which have the potential to adversely impact the quality of any decision dependent upon such data (Ballou & Pazer, 2003). For example, suppose a company decided to rent a new office. If the initial information available is not accurate, such as number of employees, distance from bus routes, and age of the building, management might make the incorrect decision regarding the rental (Gelman, 2010).

The success of an organisation and its position in national and international markets depends on its innovations particularly in difficult financial periods (Brünger-Weilandt, Geiß, Herlan & Stuike-Prill, 2011). Innovation is facilitated by transfer of quality information and knowledge from the first idea to the marketability of a product (Brünger-Weilandt *et al.*, 2011). Furthermore, information quality has become a critical concern of organisations and an active area of MIS research. The fact that managers and information users directly access information from various sources has increased the need for, and awareness of, high quality information in organisations (Lee, Strong, Kahn & Wang, 2002). Poor quality of information in modern organisations may be caused by many factors, such as the size and nature of the information, human factors, the organisation's culture, experience and skills as a manager and other team members, technology, and the quality of the inputted data (Malá, Cerná & Rusková, 2013).

There are various definitions of information quality in the literature. For example, the definition of information quality by Li, Ragu-Nathan, Ragu-Nathan and Subba Rao (2006) includes factors such as the accuracy, timeliness, adequacy, and credibility of information exchanged. From their reviews of 180 academic papers on information systems for the period 1992–2007, Petter, DeLone and McLean (2008) defined information quality as the desirable characteristics of information system outputs such as relevance, understandability, accuracy, conciseness, completeness, currency, timeliness, and usability. Likewise, in the electronic government literature, information quality is similarly defined in terms of some collection or subset of the following attributes: accessibility, timeliness, relevancy, reliability, understandability, appropriate amount, validity, accuracy, authority, objectivity, security, completeness, perceived value, freedom from error, and concise presentation (Detlor, Hupfer, Ruhi & Zhao, 2013). The US government has recognised the need for quality information disseminated to other government agencies and has published guidelines regarding information quality (Office, 2013). In this dissertation, quality is defined as an encompassing term comprising objectivity, utility, and integrity.

Toften and Rustad (2005) observed that the meaning of information quality lies in how the information is perceived and used by the customer. Rowley (2006) enhanced this observation by adding that the meaning of information quality lies in how information is perceived and used, and consumer expectations play a crucial role in defining information quality. According to Shankaranarayanan and Cai (2006), the perceived quality of the data is influenced by the decision task and that the same data may be viewed through two or more different quality lenses depending on the decision maker and the decision task it is used for.

The quality of an organisation's data is vital to its success, and poor data quality can have devastating and even deadly consequences (Lee *et al.*, 2002; Watts, Shankaranarayanan & Even, 2009). Two examples of high-profile disastrous data quality problems were the explosion of the Challenger space shuttle and the mistaken shooting down of an Iranian civilian aircraft (Fisher & Kingma, 2001).

The Challenger shuttle was lost in January 1986 because a rubber "O-ring" seal on the shuttle failed, allowing hot gas to escape and damage a fuel tank and some gears. The decision to launch the Challenger was flawed as those who made that decision were unaware of the recent history of problems concerning the O-rings and the joint, and were unaware of the initial written recommendation of the contractor advising against the launch at temperatures below 11.7o Celsius (Wall, 2016).

In July 1988, a U.S. Navy ship called the Vincennes mistook the Iranian Airbus A300 civilian airliner for a much smaller and faster F-14 fighter jet and fired two surface-to-air missiles, killing all 290 passengers and crew members on board (Fisher, 2013).

A multitude of data quality dimensions exist which can help to categorise data quality problems; examples of these dimensions include accuracy, completeness, consistency, timeliness (Ballou, Wang, Pazer & Kumar Tayi, 1998; Haug, Zachariassen & Van Liempd, 2011). Figure 2.11 shows the core dimensions of information quality.

Figure 2.11: Information quality dimensions

Without the ability to assess the quality of their information, organisations cannot assess the status of their organisational information quality and monitor its improvement (Lee *et al.*, 2002). Assessing these individual quality dimensions specified can be used to measure

the effectiveness of information in organisations (Price & Shanks, 2004; Fehrenbacher & Helfert, 2008). Information quality is a multidimensional concept, having both objective aspects that do not vary across tasks and users (e.g. accuracy and consistency) and contextual aspects, related to the perceptions of decision makers who use the information (Watts *et al.*, 2009). Some of these dimensions or attributes are briefly described in the next sections.

2.7.4.1 Relevance

The key component for information quality is whether the information addresses its customer's needs. If not, that customer will find the information inadequate irrespective of how well the information weighs against the other dimensions reviewed below (Miller, 1996). Information is relevant if it leads to improved decision making or if it reaffirms a previous decision. If it does not have anything to do with your problem, it is irrelevant (Babu, Singh & Sachdeva, 2000). This means that the relevance of information can be determined only by the ultimate user because it will depend on that person's subjective, interpretative response to the information – that is, on the extent to which the person can 'make sense' of the information and incorporate it into their knowledge base (Wilson, 2003). For example, by analysing data from customer credit card purchases, Louise's Trattoria, a Los Angeles restaurant chain, learnt that quality was more important than price for most of its customers, who were university educated and liked fine wine. Based on this information, the chain introduced vegetarian dishes, more seafood selections and more expensive wines, which raised sales by more than 10% (Laudon & Laudon, 2012).

Information relevance generally depends on the task that it is applied to, since information that is highly relevant for one task may be irrelevant for another (Watts *et al.*, 2009). Similarly, information may be of topical relevance but neglect issues of information quality which tends to happen with web searches (Gerjets & Kammerer, 2010). For example, information about the weather conditions in New York in December is relevant if you are planning a holiday in New York in December. Otherwise, this information is not relevant.

If information is derived from reliable and relevant data then the information holds value and is accurate (Vaish, Prabhakar, Mishra, Dayal, Singh, Goel & Coull, 2011). Laudon and

Laudon (2012) added that if information does not meet the quality criteria such as relevance, accuracy and reliability, then the quality of decision making will degrade.

2.7.4.2 Accuracy and reliability

Accuracy of information usually connotes that the recorded data conforms to the underlying reality of fact or value (Fisher & Kingma, 2001). Accuracy refers to absence of errors and is considered by consumers of data to be an essential characteristic of data quality (Ballou *et al.*, 1998). If the end user of information obtains the desired outcome by accessing the information and the intended purpose of the information is met then the information is accurate (Vaish *et al.*, 2011).

Reliability of information is closely related to but not the same as accuracy. Reliability is related to how the information was obtained, e.g. the quality of the source of the information (Eccles, Nash & Van Belle, 2003, p.17).

As cited, accuracy influences the value of information and consequently it is necessary to understand the related study and to explore the existing trend of valuation of information and its accuracy issues. For instance, the study by Gohmann, Barker, Faulds and Guan (2005) on information accuracy and information use for online sales systems suggests that if information provided by the system is believed to be inaccurate then perceived net benefits and returns will be lower which will result in the non-acceptance of the system. Gatten (2010) study on accuracy of academic reference lists found that even today, with so many digital tools to help authors manage this process, perfect accuracy seems unattainable.

Information inaccuracy and related problems occur in many information systems but there is also the possibility of over-accuracy. Information can be too accurate in that it exceeds the user's processing capability. This can increase information systems costs, become a drain on system credibility and even, through the confusion caused, result in misuse or abandonment (Miller, 1996). For example, an attorney might have too many facts about a case that makes it impossible to extract the few significant facts buried within (Miller, 1996). Hall, Ariss and Todorov (2007) argued in their study on game prediction that more knowledge can reduce accuracy in prediction of uncertain outcomes and simultaneously

does not necessarily improve decisions. Associated with the dimension information accuracy is timeliness of information.

2.7.4.3 Timeliness

Timeliness of data or information is the time gap between the occurrence of an event in the field until its presentation to the decision maker (Ramesh Babu *et al.*, 1998). For example in the judicial system, accuracy could refer to correctly recording facts about a disposition of a criminal case and timeliness to recording the information shortly after the disposition (Tayi & Ballou, 1998).

Miller (1996) stated that information has a cycle time which depends on how quickly new information can be processed and communicated. According to Fisher and Kingma (2001), timeliness implies that the recorded value is not out-of-date. Timeliness has also been described as the extent to which information is sufficiently up-to-date for a task (Liu & Chi, 2002).

Information must be available in time to influence the decision, and therefore can vary based upon the decision-maker and the decision circumstance; a strategic planner may use information that is several years old, but a production manager must have recent data (Ballou & Tayi, 1999).

The concept of what is timely is itself continually changing and being redefined, owing to changes in user experiences caused by technology and the competitive environment. Today, time-based competition and the concomitant reduction in operations cycle times has fuelled a demand for timeliless information (Miller, 1996). However, the timeliness of information often can be improved with additional costs. Yet, the resulting benefit is not certain (Greer Jr & Kropp, 1983).

Less timely information is sometimes inferior to the manager's expectations (Greer Jr & Kropp, 1983). For example, in financial information reporting, timeliness is an important factor affecting relevance; however, emphasising timeliness of reporting may have a negative impact on other characteristics of financial information and result in a loss in usefulness (Lehtinen, 2013). The FASB–Financial Accounting Standard Board (1993) stated

that if information is not available when it is needed or becomes available so long after the reported events that it has no value for future action, it lacks relevance and is of little or no use. Timeliness alone cannot make information relevant, but a lack of timeliness can rob information of relevance it might otherwise have had.

Therefore, there must be a compromise between information accuracy and timeliness. Eppler and Wittig (2000) analysed seven conceptual frameworks on information quality and found that the more current a piece of information has to be, the less time is available to check on its accuracy.

However, because of the dynamic nature of many environments, information also becomes less relevant and complete over time (Ballou & Pazer, 1995). For example, the inventory report produced before a big sale cannot be used for re-order purposes as it will not reflect the latest sales. Since timeliness and completeness of information overlap, completeness is described in the next section.

2.7.4.4 Completeness

Information completeness is seen as a crucial information quality factor and is viewed as a characteristic of a set of information to represent reality with all required descriptive elements (Eppler & Wittig, 2000). According to Fisher and Kingma (2001), completeness refers to the extent to which all values for all variables are recorded and retained in a data collection. For example, in a customer database, completeness of data is the extent to which the expected attributes of data are provided. That is, the customer data is considered complete if all customer addresses, contact details and other information are available and data of all customers is available (Wand & Wang, 1996). Another example is the registry of cancer patients kept by the Institute of Population-based Cancer Research in Norway. The completeness of cancer registry data is the extent to which all of the incident cancers occurring in the population are included in the registry database (Parkin & Bray, 2009). Bardaki, Kourouthanassis and Pramatari (2011) summarised the definition of information completeness of an information/data set as the ratio between the number of values that are recorded in the information set and the number of values that could have been recorded.

Similar to the requirements of different levels of accuracy, there are also different levels of completeness. Moreover, complete information for one person may be incomplete for another. Incomplete information can lead a customer astray. For instance, information systems can generate too much information – resulting in customers not being able to process it all in a timely fashion (Miller, 1996). This creates a conflict between completeness and timeliness.

Just as information precision which exceeds a customer's processing capability may be too accurate, information may also be too complete (Miller, 1996). (Miller, 1996) provided an example of an attorney dumping boxes of material on an adversary's desk, knowing that it will be impossible to unearth the few relevant facts buried within it in the available time. Additionally, the same compromise applies to the criteria of correctness and timeliness: the faster information has to be delivered to the end-user, the less time is available to check its correctness (Eppler & Wittig, 2000).

2.7.4.5 Information quality in the organisation

As stated, organisations depend on quality information for effective operations and decision making. Identifying quality information involves two steps: first, highlighting which attributes are important and second, determining how these attributes affect the customers in question (Brünger-Weilandt *et al.*, 2011).

One of the main objectives of information quality is to arm the information workers with a strategic resource to enable the intelligent learning organisation (English, 1999). From the perspective of Brünger-Weilandt *et al.* (2011), to obtain information of high quality, specific quality criteria during the entire information workflow have to be followed. For an organisation, it is important to think about how to capture, share, not lose, and apply the right information at the right time and on the right place (Malá *et al.*, 2013).

Organisations manage the quality of their information and knowledge to improve business performance and to stay ahead of competitors. This is achieved by using clear and explicit business roles and goals since unclear goals could result in managing information that organisations do not benefit from (Al-Ghassani, Kamara, Anumba & Carrillo, 2004). Without data quality, information producers will not know the correct values, and information

consumers will not know the meaning of the information and this is what most often results in business communication failure (English, 1999). Hemmatfar, Salehi and Bayat (2010) suggested that quality information gathering drives business performance by increasing market knowledge, improving knowledge management, and raising the quality of strategic planning.

As stated throughout this section, good decision making is dependent on good quality information (Khan, 2012) and business performance is dependent on good decision making (Nemati, Bhatti, Maqsal, Mansoor & Naveed, 2010). The next section deals with business performance in terms of effectiveness and efficiency.

2.8 EFFECTIVENESS AND EFFICIENCY

Worldwide, organisations are struggling with their performance measurement systems in trying to develop significant cost-effective measures that drive performance improvement without leading to undesirable outcomes. With all this confusion, Moullin (2007) believes that a clear performance measurement definition can help managers go in the correct direction and concentrate on what really counts.

Business performance management can be defined as the process of quantifying the efficiency and effectiveness of past actions (Neely, Adams & Kennerley, 2002). Efficiency and effectiveness are central terms used in assessing and measuring the performance of organisations as both terms apply to business arrangements such as strategic alliances, joint ventures, sourcing and outsourcing agreements (Mouzas, 2006).

Effectiveness relates to the output quality of the task and efficiency relates to the costs of inputs for a given level of output (Hart & Gregor, 2007). From the perspective of Lu and Hung (2011), efficiency and effectiveness can be considered as key elements for achieving greater business performance and better decision making. For example, a hospital is effective when it successfully meets the needs of its clientele and is efficient when it can do so at a low cost (Robbins & Judge, 2013).

“Efficiency is doing the thing right and Effectiveness is doing the right thing” (Drucker, 2013).

2.8.1 Efficiency

Efficiency gains can be made by applying the organisation's existing resources or capabilities to new markets and products or services (Johnson *et al.*, 2008). For instance, if a business has unused resources, assets or skills it can make use of these unused resources to diversify into a new activity.

The principle of efficiency in business is to maximise output by using limited inputs (Laudon & Laudon, 2012). Robbins and Judge (2013) described business efficiency as the degree to which an organisation can accomplish its ends at a low cost.

And so, to summarise:

- Efficiency is concerned with economy in the use of resources (Johnson *et al.*, 2008; Shi & Wu, 2014)
- Efficiency is efficient if objectives are achieved with minimal use of resources (Robbins & Judge, 2013)
- Efficiency is a measure of the relationship between inputs and outputs (Laudon & Laudon, 2012)

2.8.2 Effectiveness

Effectiveness is the level of results from the actions of employees and managers (Meyer *et al.*, 2007). The actual effectiveness of the organisation will be dependent on the quality of its people, its objectives and structure, and the resources available to it (Mullins, 2010). Robbins and Judge (2013) described effectiveness as the degree to which an organisation meets the needs of its clientele or customers. For example, McDonald's introduction of coffee attracted more customers and increased its revenues by over 30% (Meyer *et al.*, 2007; Brizek, 2014).

According to Zheng, Yang and McLean (2010), organisational performance is influenced when organisational effectiveness is aligned with organisational culture, structure, and strategy. If an organisation's overall strategy is wrong (ineffective), then applying all possible efficiency resources may not be adequate for success (Fred, 2011).

As a summary of effectiveness in business strategy, the following two points can be made:

- Effectiveness is a measure of the degree to which a business achieves its goals
- A strategy is effective if it achieves its objectives

Hence, while efficiency deals with the allocation of resources across alternative uses, given a level of output, to minimise input, effectiveness is concerned with determining which strategy, among all possible strategies, maximises long-run returns (Lu & Hung, 2011).

No matter how hard employees work, an organisation is in real trouble if strategic decisions are not made effectively (Fred, 2011). Therefore, efficiency and effectiveness can be considered to be two criteria for evaluating strategy. Section 2.4 introduced strategy in terms of the vocabulary and multiple levels. The following section describes strategy in terms of efficiency and effectiveness.

2.8.3 Strategy

The world today is constantly being changed in terms of social, economic and or political influences. These changes affect organisations in such a way that they need strong adaptive strategies to survive (Johnson *et al.*, 2008). A strategy is an integrated and coordinated set of commitments and actions designed to exploit core competencies and gain a competitive advantage (Hitt *et al.*, 2012). Haid, Schroeder-Saulnier, Sims and Hilda (2010) suggested that for an organisation to become effective, business leaders need to focus on aligning and engaging their people, the people management systems, the structure and capabilities, and including organisational culture with the strategy. The study by Nandakumar *et al.* (2010) revealed that an effective strategy will provide sustainable competitive advantage to an organisation resulting in superior performance only when the strategy matches properly with the organisation's external environment and internal conditions.

An increasing number of organisations today are using strategic management concepts and techniques to enhance the effectiveness of decisions (Fred, 2011). Strategic management was defined in section 2.4.2 as a method that focuses on integrating management, marketing, finance/accounting, production/operations, research and development, and information systems to achieve organisational success. Furthermore, businesses

continuously seek to improve the efficiency of their operations in order to achieve higher profitability. According to Laudon and Laudon (2012), information systems and technologies are some of the most essential tools available to managers for achieving higher levels of efficiency and productivity in business operations, especially when coupled with changes in business practices and management behaviour.

With the dramatic changes in information technology that have occurred in recent years, the ability to effectively and efficiently access and use information has become an important source of competitive advantage in virtually all industries (Hitt *et al.*, 2012, p.12). For example, the advances in information technology have provided small firms with more flexibility to be able to compete with large firms, if that technology can be used efficiently.

In the same way that IT has progressed to adapt and support business strategy, Campbell, Kay and Avison (2005) stated that organisations are also seeing the potential of the value of aligning information systems with organisational processes, goals and strategies. Therefore, based on this tight relationship between IT and strategy, the next section depicts the alignment of information systems with business strategy.

2.8.4 Aligning information systems and strategy

Traditionally, information technology was considered to be a support function of the business. To gain both strategic and competitive advantage using information technology, IT must be shifted such that it can play a key role in strategy formulation and implementation (Luftman, Lewis & Oldach, 1993). Therefore, a thorough understanding of the strategy of an organisation is a necessity for developing an effective IT strategy (Shupe & Behling, 2006). For example, (Ramirez, Melville & Lawler, 2010) stated that IS strategy can be considered as the shared view of the IS role within the organisation to support business strategy. The requirements for an organisation to have a successful IT infrastructure follows the same requirements as other parts of the business – inspired leadership, superb execution, motivated people, and thoughtful attention and high expectations of senior management (Feld & Stoddard, 2004).

The constant and rapid development in information communication and technology in recent years coupled with fusion of IT and business strategy is dramatically shifting the way

companies compete. Stemming out of this rapid development in IT is an abundance of literature on the topic of strategic alignment. For instance, IS and business strategy are intrinsically linked and alignment should be achieved while developing the IS strategy (Chen, Mocker, Preston & Teubner, 2010).

2.8.4.1 Strategic alignment

There are numerous interpretations of strategic alignment. A recurring topic in academic literature is a strong connection between IT infrastructure and the overall business strategies of the organisation. For example, Pankratz (1991) argued that to achieve organisational effectiveness and efficiency, there must be a functional fit between defined business strategy, complementary information technology strategy, supportive organisation strategy and culture and financial/balance sheet strategy. For example, (Chan, Huff, Barclay & Copeland, 1997) found that companies with high IS strategy alignment are better performing companies. This is supported by Bergeron, Raymond and Rivard (2004) who proposed that organisational performance is the consequence of aligning one or more factor such as strategy, structure, technology, culture, and environment. (Bergeron et al., 2004) added that organisations whose strategy and structure are aligned should be less vulnerable to external change and internal inefficiencies and should thus perform better. Strategic alignment assists an organisation by maximising return on IT investment, helping to achieve competitive advantage through IS, and by providing direction and flexibility to respond to new prospects (Avison, Jones, Powell & Wilson, 2004).

Henderson and Venkatraman (1999) illustrated strategic alignment with a model based on business strategy, information technology strategy, organisational infrastructure and processes, and information technology infrastructure. Figure 2.12 below has been adapted from these authors.

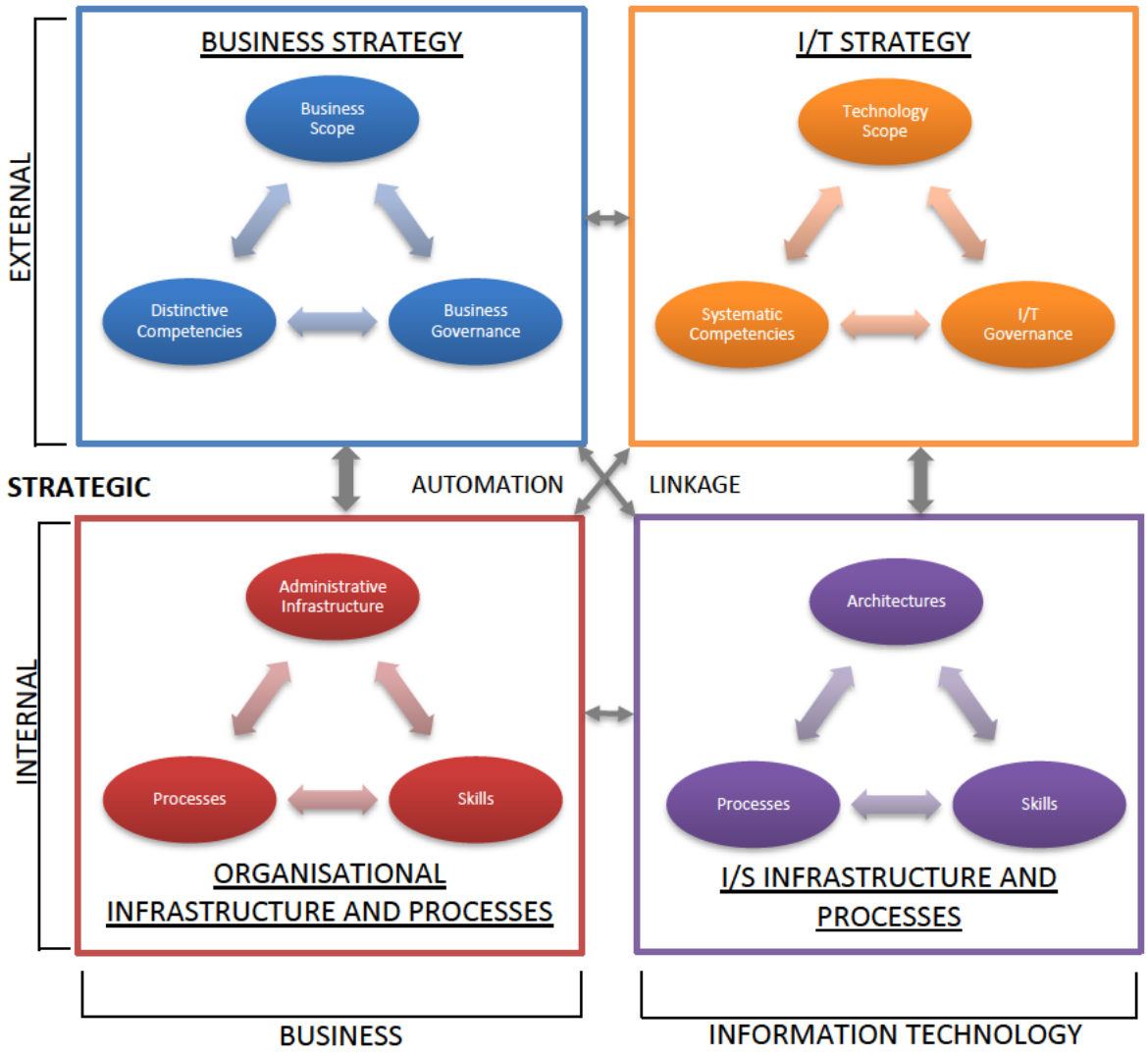

Figure 2.12: Strategic alignment model
Source: Adapted from Henderson and Venkatraman (1999)

Henderson and Venkatraman (1999) argued that for effective management of IT, it is necessary to ensure balance among the choices made across all four domains. Achieving alignment between business and IT strategies has long been a crucial issue for many organisations, starting in the 1990s when IT started to become an integral component of organisations (Gartlan & Shanks, 2007). The improvement and spread of e-business by the early 2000s brought the alignment between business and IT strategies to prominence again (Goh Bee, 2007; Raymond & Bergeron, 2008).

According to Luftman, Papp and Brier (1999), for an organisation to achieve alignment it requires strong backing from senior management, good working relationships, right

direction, suitable prioritisation, trust, and effective communication, as well as a complete understanding of the business environment.

Alignment enables an organisation to maximise its IT investments while integrating its business strategies and goals to increase profitability (Papp, 1999). The study of Gartlan and Shanks (2007) showed that alignment between business and IT strategy allows organisations to exploit IT functionality to achieve business goals. Furthermore, Gartlan and Shanks (2007) added that the inability to achieve these goals is partly due to a lack of alignment.

Shupe and Behling (2006) stated that if IT strategy does not fit with the overall organisation's vision, there will be constant conflict. Aligning IT strategy with business strategy is not an easy task. The findings of the study of Gartlan and Shanks (2007) within Australian organisations shows that an alignment promoting organisational culture and an attitude that IT is an organisational tool are difficult to perform successfully. But Gartlan and Shanks (2007) also pointed out that Australian organisations believe that alignment is important and can bring considerable tangible and intangible benefits. Senior managers have established that IT strategy plays a leading role in delivering top line value in business transformation and performance such that IT strategy is now discussed in boardrooms instead of computer rooms (Smith *et al.*, 2007).

The strategic actions that take place in the context of integrated strategy formulation and implementation actions result in desired strategic outcomes. The process of strategic alignment is evolutionary and dynamic which requires continuous change (Henderson & Venkatraman, 1999; Luftman *et al.*, 1999). Consequently, the process of strategy implementation in this rapidly changing IT, ever-changing markets and competitive structures should dynamically change to align to the new strategies and environment (Hitt *et al.*, 2012). Therefore, strategic alignment is not an event but a process of continuous adaptation and change (Henderson & Venkatraman, 1999).

Alignment of IT and business strategies is critical for any successful organisation since IT supports other business activities, such as top management, IT staff and people in other departments (Stair & Reynolds, 2006). Since many businesses now require IT to meet their

goals, IT is now included in their business plans and is formulated as the business strategy (Haag *et al.*, 2000; Johnson *et al.*, 2008).

2.8.4.2 Information technology (IT) strategy

It is evident that developing IT strategy that supports and is supported by business strategy is critical for creating business value in organisations. As previously mentioned, IT strategy is an integral part of the business strategy. The objective of an IT strategy is to explain how information systems and technology should be utilised as part of an organisation's overall business strategy, whether operational or managerial and whether short, medium or long term (Haag et al., 2000). In addition, IT strategy should also show how the information technology resources should be designed to support the overall business strategy of the organisation (Rouse, 2012). These resources can include aspects of technology management as shown in Figure 2.13.

Figure 2.13: Typical resources in an IT strategy
Source: Adapted from Rouse (2012)

Technology management will usually include the management of hardware and software used by the organisation when specified in the IT strategy. External client management typically comprises the debtors and suppliers.

By synthesising definitions from previous studies, Gartlan and Shanks (2007) described IT strategy as a strategic business tool used to structure a future path and to address the use and management of IT resources, business IT relationships both internal and external, and the flow and storage of information throughout the organisation.

According to Smith *et al.* (2007), organisations have not yet managed to develop an effective IT strategy by reason of the rapidly changing business environments and nonstop evolving IT; they have yet to learn how to develop an effective IT strategy.

The key value of IT is the ability to be employed to solve business issues, or facilitate business opportunities. With strategic alignment, IT supports the strategies of an organisation which in turn create business value. But this is not always the case. Ryssel, Ritter and Gemunden (2004) found that the existence of IT in an organisation does not guarantee the creation of additional value. The authors advocated that trust and commitment have a significant impact on value creation and as such concluded that value creation is a function of the relationship atmosphere and not of the technology employed (Ryssel *et al.*, 2004). Likewise, Wang *et al.* (2012b) stated that organisations cannot merely rely on IT resources and IT capabilities to generate business value; instead they need to focus on the effective use of IT to support competitive strategies and core competencies.

The challenge of the cooperation between IT, strategy and alignment is to maximise business value. Since IT plays an increasing role in defining business strategies, its correct application will assist an organisation to be more competitive and profitable. Thus, assessing the organisation's strategic alignment is critical to guarantee that IT is correctly being used to support the business strategy.

It is evident that to survive volatile economic environments, businesses should re-evaluate outdated strategies, structures, processes and cultures.

Innovation in communication and communication technologies over the past decade is changing the very nature of business, with increasing emphasis being placed on the

centrality of knowledge and innovation generated increasingly through networks (Tsai, 2001). This new economic environment is often called the 'network economy' which has enabled the distributed generation of value and enabled organisations to capture a portion of this value to create innovative business ideas and new strategies (Kauffman, Weber & Wu, 2012). This concept of networked economy has raised new questions in terms of strategy, corporate social responsibility and sustainability compared to traditional hierarchical organisations. These issues are dealt with in the following section.

2.9 THE NETWORKED ECONOMY

With the world becoming more global and competitive but still less predictable, there is a mounting emphasis on innovation activities to maintain competitiveness (Pellissier, 2012). In emerging technological arenas, innovation does not only occur in isolation. Quite the reverse, innovations are generated and implemented by networks of interacting organisations and individuals (van der Valk, Chappin & Gijsbers, 2011). Furthermore, Kauffman *et al.* (2012) added that innovation in communication and communication technologies over the past decade has enhanced distributed generation of value in businesses which in turn has resulted in a plethora of innovative business ideas and new strategies.

Advancement in technologies coupled with economic globalisation is transforming the nature of business where growing importance is being placed on the centrality of knowledge and innovation generated increasingly through networks (Tsai, 2001). Even decision makers are stressing the increasing significance of collaboration networks for improvement (van der Valk *et al.*, 2011).

The networked economy can be described as the economic order within the framework of the technological information society which utilises technological advances like the information market and social networking platforms to establish the value of goods and services (Saylor & Allen, 2013). Fuentelsaz, Maicas-López and Polo (2002) suggested that various alternatives have been employed to describe the networked economy, with the most accepted and widely used being the digital economy and the information economy. For example, the world economy is undergoing a fundamental structural change driven by

the globalisation of business on the one hand and by the revolution in information and communication technology on the other (Pohjola, 2002). Saylor and Allen (2013) added that the network economy utilises technological advances like the information market and social networking platforms to establish the value of goods and services.

As stated, the networked economy is also frequently referred to as the internet economy. For instance, in the report "Measuring the Internet Economy" by Organisation for Economic Co-operation and Development, the internet economy is defined as covering the full range of all economic, social and cultural activities supported by the Internet and related information and communications technologies (OECD, 2013).

There are numerous other terms that are used to describe the changing world – the post-industrial era (Boria, 2006), information society (Aguirre, 2005; Broos & Cronjé, 2009), digital work environment (Broos & Cronjé, 2009), knowledge era (Makri-Botsari & Paraskeva, 2010), the digital economy (Mortezaei, 2012), the new economy (Cappelli & Keller, 2013), and more.

The networked economy can be considered from various viewpoints – its inherent structural differences from industrial economies (Clarke, 2003), the digital and information infrastructure (Pohjola, 2002; Mohamad & Ismail, 2013), value networks (Iyamu, 2011; Lambert & Davidson, 2012), globalisation (Pohjola, 2002) and intellectual property rights (Buckley, Montes, Henry, Dalton, Gill, Dumagan, LaPorte, Cooke, Pastore & Price, 2000). The adoption and success of the networked economy has been facilitated with the advances in information technologies and in particular the Internet (Manyika & Roxburgh, 2011; Kauffman *et al.*, 2012). With the advent of the Internet, networked economies are more important than ever (Burrus, 2010; Kolarić, Grubić Nešić, Petrović & Radojčič, 2012).

2.9.1 The new economy

The "new economy" is considered to be the third major economic revolution (Kouzminov, Yakovlev, Gokhberg, Larionova, Shadrin, Kuznetsov & Gavrilenkov, 2003). The first economic revolution, the "industrial revolution", focused on mechanisation of labour where companies achieved competitive advantage by substituting machines for human labour (Porter & Millar, 1985). The second economic revolution concentrated on the

automation of the production process (North, 1993). The new economy imposes the professionalism and the technocracy in the economy and is based on the result of the scientific development in technologies (Ramona, 2011). Ramona added that in the "new economy" people work with their brains instead of their hands and information becomes a resource for individuals and organisations, it can be used without consuming it.

This economic revolution has been made possible due to the continuing stream of information technology innovations that are transforming the traditional business world. Laudon and Laudon (2012) listed the emergence of cloud computing, the growth of a mobile digital business platform based on smartphones, netbook computers, and, not least, the use of social networks by managers to achieve business objectives as some examples of transforming technologies.

Many successful innovations do not simply rely on new science or technology, but the reorganisation of all the elements of business into new combinations. Here, innovators are creating complete modern business models, bringing customers, producers and suppliers together in new ways, with or without new technologies (Johnson *et al.*, 2008). For example, new airline business models exclude travel agents by allowing customers to book tickets directly from the airline via the Internet. According to OECD (2013), the Internet which began as a tool for improving communication has been transformed into a universal technology supporting all sectors across the economy. The Internet can even be compared to a general purpose technology similar to electricity (Jovanovic & Rousseau, 2005; OECD, 2008; Ristuccia & Solomou, 2010).

The information revolution goes beyond the creation of computer and telecommunications equipment (Jarboe, 2001). The creation of knowledge and information is just as important as the creation of the hardware. Jarboe (2001) further highlighted that the basic concept of the information economy is that information and knowledge are an organisation's key assets and business success stems from exploiting those assets.

The new economy is comprised of three unique attributes; it is global, it is based on information, knowledge and relationships, and it is deeply interconnected. Throughout this discussion, information has been seen as the common and most valuable resource for business success in the information economy. That also entails the creation and expansion

of efficient external electronic communication with consumers, as well as boosting the internal electronic communication among the staff members. The ensuing section clarifies some of the communication tools available and used by businesses for collaboration and communication in the information economy.

2.9.2 Collaboration tools

Present-day organisational life is exemplified by the use of a growing number and variety of communication technologies. No individual, group, or organisation can succeed without sharing information among its members. Communicating, however, is more than merely imparting meaning; that meaning must also be understood (Robbins & Judge, 2013). Effective communication is critical to any business and there are a number of technological tools that facilitate this process. Tools such as e-mail, instant messages, social networking conferencing and video conferencing assist in the creation of environments for good business communications. Some of the common modern electronic communications methods used by businesses are described next.

2.9.2.1 E-mail

E-mail is one of the most extensively used methods of technological business communication. E-mail uses the Internet to transmit and receive information. While companies may use many different and newer forms of communication, e-mail is still one of the most effective communication methods available when it is used properly. Moreover, e-mail is being used, on a large and still increasing scale and, as such, has reached a stage of maturity almost comparable to that of the telephone (van den Hooff, Groot & de Jonge, 2005).

E-mail messages can be quickly written, edited, and stored. E-mail has been the ultimate collaboration tool by providing almost real-time communications. E-mail today even serves as an archiving and filing system, a project management platform as well as an official log and record of interactions that can be leveraged in a court of law (Chee Sing, 2009).

There are drawbacks to e-mail communication technologies. Robbins and Judge (2013) suggested that risks of misinterpreting the message, time wasted to sift through thousands of e-mails and privacy concerns are some of the drawbacks of e-mail communication. For example, Hemp (2009) argued that people usually take an average of nearly 25 minutes to return to a work task after an e-mail interruption.

2.9.2.2 Instant messaging and text messaging

Similar to e-mail, instant messaging and text messaging use the electronic media. Instant messaging and text messaging allow communication in real time with another individual. This type of communication is analogous to a telephone conversion but using text instead of voice. In addition, many instant messaging systems allow users to engage in real-time conversations with multiple participants simultaneously. Instant messaging can be sent by both computer and a smartphone whereas text message is only sent by a mobile phone.

There are some potentially negative consequences of instant messaging and text messages. Firstly, some users find the technology intrusive and distracting as its persistent presence can make it hard for employees to concentrate and stay focused (Robbins & Judge, 2013). Secondly, instant messaging introduces threat and security concerns allowing outside connection from the Internet to access corporate networks (Licari, 2005).

2.9.2.3 Blogs

A blog, also known as a weblog, is a website of personal or non-commercial origin that uses a dated log format updated daily or very frequently with new information about a particular subject or range of subjects (O'Brien & Marakas, 2010). Basically, a weblog is an informal but structured website where individuals can publish stories, opinions, and links to other websites of interest. The major attractor of blogs is their social nature where communities can be formed both through subject association, for example blogs about a common musician, and through a network of links and posted comments (Li & Chignell, 2010).

A business blog is a corporate tool for communicating with customers or employees to share knowledge and expertise. Laudon and Laudon (2012) stated that businesses are using

blogs for internal use to foster collaboration and information exchange between individuals and teams due to the fact that blogs help capture, consolidate, and centralise the knowledge for a business.

Because blogs make information sharing easy, they have many business uses. The main drawback with blogs is that since some companies do not have policies governing the content of blogs, bloggers can post comments that could be construed as harmful to the company's reputation.

2.9.2.4 Video conference

Video conferencing is perhaps the most technically advanced alternative for communication over distance. Video conferencing permits employees in an organisation to have real-time meetings with people at different locations. Live audio and video images let participants see, hear, and talk with each other without being physically in the same location (Robbins & Judge, 2013). In most cases, video conferencing systems allow for documents and illustrations to be shared and even co-edited. The technology is advancing rapidly, with functionality available on different platforms and networks such as mobile telephones, personal digital assistants (PDAs) and portable computers (Julsrud, Hjorthol & Denstadli, 2012).

Facilitating business meetings is one of the main reasons for businesses to use video conferencing technologies. The business meeting is a core activity in many organisations, independent of the number of branches, size or nationality (Alhlak, Ramakrisnan, Hameed & Mohseni, 2012). However, Robbins and Judge (2013) noted that it is especially important to stimulate questions and involve all participants in order to avoid someone who is linked in but disengaged.

2.9.2.5 Social network

A social network can be defined as a group of social actors that interrelate or exchange information with one another (Phillips & Phillips, 1998). Individuals communicate and form relationships through internet social networking websites such as Facebook and LinkedIn.

The study of a social network that exchanges information between and among its members provides interesting insights into how knowledge is spread throughout a business community.

Internet-based social media has made it possible for one person to communicate with hundreds or even thousands of other people about products and the companies that provide them. Thus, according to Mangold and Faulds (2009), the impact of consumer-to-consumer communications has been greatly magnified in the marketplace. Burrus (2010) added that innovative companies have started to adopt social networking as a way to enhance communication, information sharing, and collaboration, thereby allowing them to implement many innovative, even radical, business practices.

Social networking sites are applications that enable users to connect by creating personal information profiles, inviting friends and colleagues to have access to those profiles, and sending e-mails and instant messages between each other (Kaplan & Haenlein, 2010). Popular social networks such as Facebook, Twitter and LinkedIn provide communication, storage and social applications for hundreds of millions of users across the world. Figure 2.14 shows the number of users registered to the top social networking sites (Smith, 2013).

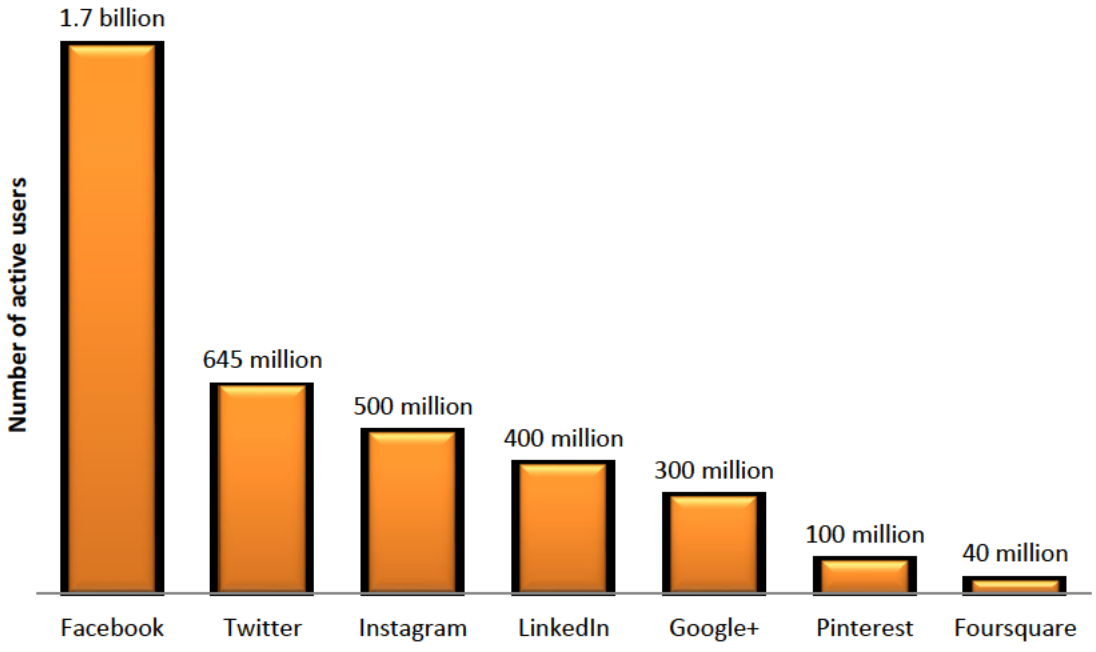

Figure 2.14: Number of active social media users
Source: Adapted from Ajmera (2014), Herman (2014) and Sareah (2015)

There has been a growing increase in the usage of social networks by corporations due to increases in globally distributed work. For example, especially in large organisations, it is more difficult to find people with specific competencies and this renders the establishing and maintaining of social relationships with remotely located peers a time-consuming matter (Richter & Riemer, 2009). A survey by the research firm Gartner Inc. indicated that by 2014, social networking would replace e-mail as the primary form of communication for 20% of business users.

Many businesses also feel that social networking can be problematic when used by employees. Furthermore, corporate organisations feel that they might lose control of information flows which can pose a security threat to the organisation (Burrus, 2010). Besides, in willing to maintain control over employee use of social networking for professional purposes, many organisations have developed their own in-house social networking applications (Robbins & Judge, 2013). For example, the University of Brighton (UK) and the University of Leeds (UK) are both providing an in-house social networking environment for use primarily in an e-learning content (Kelly, 2008). Mergel and Bretschneider (2013) stated that in-house social networking platforms, such as the use of Intellipedia, a social media suite that includes a wiki for information creation and sharing, are used among the government agencies of the intelligence community.

There are other electronic communication tools that are used by business in addition to the five mentioned above.

This section has introduced the concept of the networked economy and described the popular electronic communication tools available to businesses.

2.10 SUMMARY IF CHAPTER TWO

This chapter has shown that the role of businesses has shifted from the traditional profit-making model to an emphasis on the management of multiple stakeholders. Communicating and engaging effectively with stakeholders during the life span of projects is becoming a strategic element. Stakeholders and strategy are closely linked and strategy should be based on the fact that stakeholders have the potential to threaten as well as support the organisation.

To increase profitability of competitive success, organisations must match strategy and structure. Furthermore, organisational structure affects personal and departmental relationships and in return aids or obstructs communication and efficient process flow. To support strategy at all levels of the organisation, there is an increased reliance on information technology and information systems. Furthermore, to capitalise on the growing significance of information technology, organisations are employing chief information officers (CIO) and chief technology officers (CTO).

Information technology should also be aligned with the organisation's strategy such that IT investments are maximised while supporting business strategies and goals. Besides, businesses are placing more emphasis on new electronic communication technologies such as e-mail and social network sites for enhancing communication amongst employees and stakeholders.

Information has been the central concept throughout this chapter. The term is used in the title of the study and almost every section of this chapter. However, there are challenges.

Even though there is ever more information available, it is not to say that all information is reliable and of a high quality. Despite the success and obvious benefits of electronic communication technologies, they nonetheless do attract concomitant circumstances that could lead to problems. These will be discussed in Chapter Three.

CHAPTER THREE

INFORMATION OVERLOAD IN THE LITERATURE

3.1 POSITIONING OF THE RESEARCH

As stated in Chapter Two, in most companies today, information has become one of the most important assets; however, the way that information is managed can make all the difference. Information is an economic resource which can be measured on the same level as other resources such as human capital, capital and fixed assets.

This chapter offers a critical examination of the extant literature on information overload perception from an organisational and personal context. Given the impetus of information presence in the world we are living in today, it is important to achieve an understanding of the nature of information overload interactions across multiple contexts.

This chapter reviews and critiques published literature, both in South Africa and internationally, which explores the issues of information overload and its associated and related concepts in terms of its causes, effects and possible counter measures. The chapter also summarises and synthesises recommendations from previous studies and associates these with the South African context. Additionally, this chapter highlights the current research deficiencies and prepares a series of research questions focusing on the South African context and proposes a methodology that could provide answers to these questions.

3.2 INFORMATION OVERLOAD – A HISTORICAL PERSPECTIVE

Humans have shared information for as long as they have existed. However, the way we communicate has changed over time – from cave walls, clay tablets, papyrus leaves, newspapers, radio, broadcast television, to personal computing devices. One of the greatest significant shifts in the past decade is how information has changed shape (Lindkvist, 2011). Today, humans can read any newspaper in the world on the Internet or on their mobile phones. The information age has brought infinite new sources and innovative ways of exchanging information. Some of these are voice and video phone calls, e-mail, social network sites, rich site summary (RSS), short message service (SMS),

multimedia messaging service (MMS) and instant messaging. Ajmera (2014) summarised statistics from various social media websites and found that there are over 400 million tweets sent daily and there are 4.2 billion people who access social media sites via a mobile device. In addition, de Kunder (2017) estimated the minimum size of the indexed World Wide Web based on the numbers of pages indexed by Google, Bing, Yahoo Search as at May 2017 to 4.49 billion pages.

The soaring number of information channels coupled with the development of the Internet and wireless technologies has resulted in increasing amounts of data and information that users need to face and handle (Lubowitz & Poehling, 2010; Hipp, Mutschler & Reichert, 2011; Lindkvist, 2011). With the proliferation of these new information sources, it is turning out to be increasingly imperative to recognise the impact of these technologies on information workers within information seeking and retrieval contexts.

The growing need for information in today's world requires the development of information systems (Lipaj & Davidaviciene, 2013). For example, with less information it is easy to make rapid decisions, but this can lead to frustration later when decisions prove to be wrong and supporting data are not re-creatable. Furthermore, this problem is exacerbated when multiple data sources and numerous information channels must be considered (Boyd, 2004). Fixing these problems can be time consuming and expensive, particularly for users or organisations that do not possess an innate information competency. Building on this, Batra (2007) stated that in complex settings, being able to pull only the relevant information and efficiently share, interpret and use this information for decision making becomes a challenge when the right tools and information systems are missing. Likewise, Zhuang *et al.* (2011) suggested that whilst insufficient information will result in poor decision making, too much of it, ironically, can also have the same consequence. When there is too much information, additional resources, especially time, will be needed to process it.

The information revolution has become a global phenomenon which has resulted in the stream of information becoming difficult to manage (Krinn, 2011). Whilst information is readily available at one’s fingertips, these modern sources of information and communication tools have resulted in information overload. Information overload

describes a situation where the amount of information received becomes excessive and overwhelming, reaching a level where it cannot be processed efficiently (Jackson & Farzaneh, 2012; Park & Jang, 2012; Bontcheva, Gorrell & Wessels, 2013).

Information overload is not a new phenomenon, but it originates from the time when Gutenberg invented the printing machine (Carlevale, 2010). The invention of movable type started the propagation of printed matter that quickly exceeded what a single human mind could absorb in a lifetime (Hemp, 2009). Prior to this, Edmunds and Morris (2000) stated that information overload could be dated back to the 1800s by referencing the work of Haynes (1996), who reported that with the rapid growth of case law in the 1800s (18 volumes in 1810, 800 in 1845 and 3800 by 1885) there was already too much information and too many sources.

As a summary, the following key information challenges are shown in Figure 3.1.

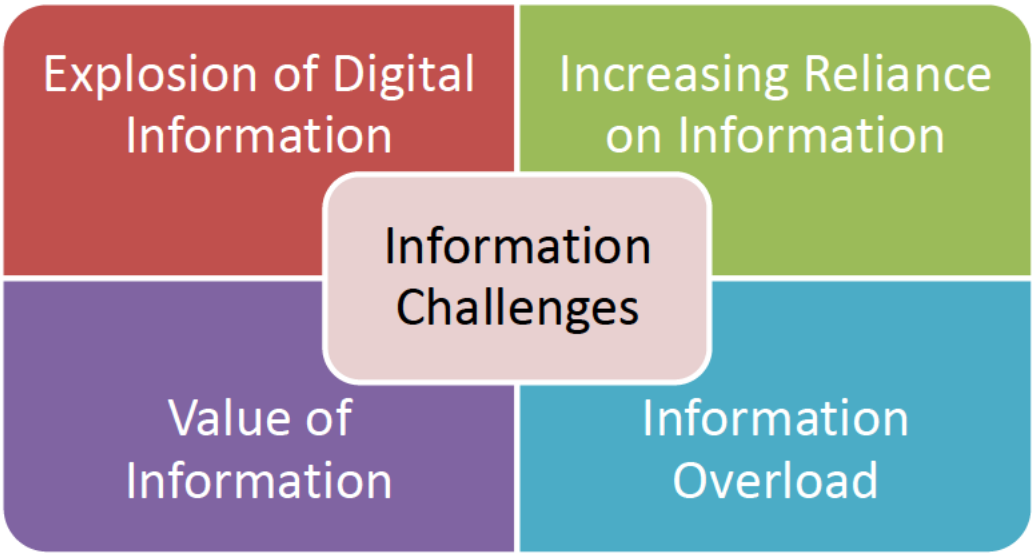

Figure 3.1: Information challenges

The first challenge is the explosion of digital information. The rate of digital information growth is increasing exponentially as a result of numerous information channels and emerging electronic information communication devices (Anderson & de Palma, 2012; Denton & Richardson, 2012). There is an increase in the reliance on information as information plays a crucial role in reducing uncertainty (Citroen, 2011). The strategic use of information plays a vital role in determining the success of a business and enables

competitive advantage in the marketplace. The value of information is another challenge due to the positive relationship between information-processing capability and firm performance (Wang *et al.*, 2012b). The value of information often changes over time; information that is valuable today may become less important tomorrow. Lastly, there is information overload which is an imbalance between the capacity of information processing and the amount of information received (Hu & Chen, 2011).

Given that the aim of this study was to establish whether information overload exists in South African shipping companies and if it is being formally managed, the following sections of this chapter explore the phenomenon of information overload, providing definitions and, specifically, the resonance that can be drawn from the analysis of the existing frameworks dealing with information overload in business environments.

Furthermore, there are several other issues which has encouraged interest and discussions in this topic. Table 3.1 lists such issues and the sources in which they are dealt with.

Table 3.1: Related information overload issues

Issues associated with information overload	Source
Cognitive strain and stress	Schick, Gordon and Haka (1990)
Loss of job satisfaction	Bawden, Holtham and Courtney (1999)
Generate the potential for un-justified risk taking and error	Sparrow (1999)
Increasing one-time reading and selective reading	Liu (2005)
Poor decision making	Krinn (2011)

The result of assessing literature on these concerns offers a framework for additional policy initiatives. It also emphasizes gaps in the literature which would be beneficial in identifying areas for future research that should be addressed, especially in a South African context where this explosion of information is not that widespread and not much literature exists on the subject compared to the Western, European and Asian countries.

There are several terms that describe the premise of information overload. The next section defines some of these terms and other related terms that are used within this dissertation.

3.3 INFORMATION OVERLOAD

Information has evolved from fixed and tangible to a steady stream of often contradictory intangible statements (Lindkvist, 2011). A book, a report or a magazine can be considered to be tangible or fixed information and online stock prices, Wikipedia articles and blogs are intangible information (Daniel & Titman, 2006; Lindkvist, 2011). Intangible are hard to quantify but are important, for example in financial markets, participants might find news (which is constantly) reports hard to quantify but are important for market participants' decisions (Epstein & Schneider, 2008). Similarly, tangible information in the financial market can be a company balance sheet report which is fixed (Agnew & Szykman, 2005).

The advances in information and communication technology have made information abundant and easy to reproduce and exchange. The growing number of information sources coupled with the development of the Internet has resulted in increasing amounts of data and information that users receive and need to process (Lubowitz & Poehling, 2010; Hipp *et al.*, 2011; Lindkvist, 2011). Whilst information is readily available at one's fingertips, the superabundance of information is resulting in information overload. One of the fastest growing commodities on this planet is the amount of information being produced and information overload is recognised as potentially a big problem for society (Jackson & Farzaneh, 2012).

There are numerous studies on information overload within many disciplines which have resulted in various definitions of the term. But there is no universally accepted definition for information overload even though most of the definitions share common themes.

3.3.1 Definitions, key and related terms

Before defining information overload which is partly associated with the term excess, it is necessary to first briefly explain the notion of excess. When humans think about excess, they instinctively think about too much of something. Himma (2007) explained the concept of excess in the form of this statement: "A person has an excess of something if and only if that person has too much of the something than is needed, desired, or optimal". In contrast, the author added that to be overloaded with something is not only to have an excessive amount of the something but it is also an undesirable state.

The term information overload was popularised as early as the 1970s by Toffler (1970, p. 23) and was characterised by him as the difficulty a person faces when taking a decision in the presence of excessive information. Toffler (1970) hypothesised that there is a threshold in the amount of information a human brain can absorb and handle. Beyond that threshold the brain becomes overloaded, reasoning is blurred, and can cause physical and mental disturbances. He termed this phenomenon "future shock syndrome".

According to Hiltz and Turoff (1985), information overload can be defined as a situation where an individual is presented with an amount of data which exceeds his or her cognitive capacity. Losee (1989) defined information overload as the “economic loss associated with the examination of a number of non- or less-relevant messages, as in related to information retrieval models”. Information overload can also be described as a situation where people are swamped with more information than they are able to usefully use (Ireland, 1999). Edmunds and Morris (2000) explained that information overload is usually associated with a loss of control over the situation, and sometimes with feelings of being overwhelmed.

Bawden *et al.* (1999) defined the term information overload as a way to represent a state of affairs where the efficiency of an individual in using information in their work is hampered by the amount of significant, and possibly useful, information available to them. Yamin and Ramayah (2011) added that the abundance of information on the Internet has added to the information overload problem due to the fact that search engines return large volumes of information. This presents a problem for users who find it difficult to filter through this “tsunami” of information.

In ordinary language, the term ‘information overload’ is often used to convey the simple notion of receiving too much information. Within the research community this everyday use of the term has led to several studies related to information overload and related concepts which introduced different terms and labels. Krinn (2011) introduced the term information fatigue, where humans struggle to deal with information in the subconscious because new information or opinions keep arriving via e-mail, text messages and tweets. Other earlier research used other terms such as information fatigue syndrome (Oppenheim, 1997), data smog and information glut (Shenk, 1998) and information anxiety (Sparrow, 1999). Table 3.2 lists some of these terms as they appear in the literature.

Table 3.2: Terms related to information overload

Term	Source
Overabundance of irrelevant information	Ackoff (1967)
Information flood	Fiala (1987)
Infobog	Tetzeli (1994)
Information fatigue syndrome	Oppenheim (1997)
Data smog, Information glut, Info-pollution	Shenk (1998)
White noise	Calcutt (1998)
Information and data asphyxiation	Van Winkle (1998), Napirlica (2007)
Communication pollution	Sparrow (1999)
Information anxiety	Sparrow (1999)
Cognitive overload	Kirsh (2000)
Information poverty	Goulding (2001)
Information stress	Woodhead, Ashley, Atkinson and Moore (2001)
Infobesity	Morris (2003)
Data deluge	Hey and Trefethen (2003)
Information pathologies, Information avoidance, Library anxiety, Paradox of choice	Bawden and Robinson (2008)
Infoxication	Benito-Ruiz (2009)
Information explosion	Israel (2010)
Attention fragmentation	Dean and Webb (2011)
Information overdrive	Denton and Richardson (2012)
Information pollution and crime	Berkan (2012), Wang, Jiang, Meier and Zeng (2012a)

All these terms have one common basis which is the problem with the quantity, quality and processing capability of information. With so many different definitions and terms, there is a challenge in finding a common definition.

3.3.2 Challenges in defining information overload

There is no universally recognised definition of information overload, but various recommendations have been made as described in the previous section. Most of the definitions comprise two categories: the limited human information-processing capacity (Meyer, 1998; Schuff, Turetken & D'Arcy, 2006) and overabundance of irrelevant information (Edmunds & Morris, 2000; Toften & Rustad, 2005; Himma, 2007).

The view of Owen (1999) is that information overload is not a function of the volume of available information but a gap between the volume of information and the tools we have to assimilate the information into useful knowledge. But Rochat (2002) argued that a time factor is missing from most definitions and suggested definition overload when large quantities of varied sources of business and personal information are received on a regular basis at a rate that limits assimilation and is increased by unsolicited information. Himma (2007) argued that although the use of the phrase information overload is becoming increasingly common, it is not clear what it means beyond the obvious fact that we have more information than is good. The author added that the concept of good information is very subjective and thus the difficulty in defining information overload.

Bettis-Outland (2012) summarised the definition of information overload as a multidimensional construct, consisting of three components: equivocality, quantity, and variety. The author referred to equivocality as the existence of multiple valid interpretations of information. Quantity is the measure of the volume and availability of information and variety measures the different sources of information.

Whilst there is no single definition of the term, what is evident from the foregoing definitions is that information overload is characterised by excessive information arriving too quickly, which is sometimes irrelevant and which may exceed one's capacity to process or comprehend.

Jackson and Farzaneh (2012) argued that a large number of these definitions emphasise the high-level factors of information overload which also fall into the categories of intrinsic (i.e. psychological) and extraneous (i.e. tangible) factors. Intrinsic factors are fundamental elements of the information overload problem and directly influence information overload. Extraneous factors indirectly contribute to information overload and have a direct effect on intrinsic factors. This means that intrinsic factors directly affect information overload and extraneous factors indirectly affect information overload.

This multi-definition and widespread interest in information overload indicates a crucial concept necessitating extra consideration. The ensuing sections delve into diagnosing the causes and the symptoms of information overload and suggesting preventative actions.

3.3.3 Causes of information overload

Multiple researchers have tried to define information overload in their own terms, but all the descriptions have very common themes that can potentially be used as a diagnostic tool. Nevertheless, to deal successfully with information overload, the symptoms must first be recognised and the causes must be determined. Several researchers have identified symptoms and causes of information overload which they have categorised under multiple factors.

Kirsh (2000) clustered the causes of information overload into four groups: too much information supply, too much information demand, the need to deal with multi-tasking and interruption, and the inadequate workplace infrastructure to help reduce metacognition. Ruff (2002) proposed an analytical model to describe the causes of information overload. He organised the causes using five categories in his model. These categories are people, technology, the organisation, processes and tasks and information attributes. A similar classification was introduced by Farhoomand and Drury (2002) who noted that the major elements of information overload included: sheer volume of information, irrelevant information (noise), time constraints, and multiplicity of information channels.

Likewise, the conceptual model developed by Eppler and Mengis (2004b) is based on three testable models: the causes and the symptoms of information overload and its countermeasures. In this model, the authors identified five main causes of information overload at organisational and interpersonal levels:

- Characteristics of the information: Quantity, frequency, and quality
- The person receiving, processing or communicating information: The motivation and experience of the person
- The tasks or processes: Time pressure and accounting standards
- Organisational design: Centralisation, global, collaborative work
- Information technology used in the company: E-mails, the Internet and social media.

The causes of information overload according to a study on investment in retirement annuity plans can similarly be arranged under quantity, too many options and too much similarity (Agnew & Szykman, 2005).

The study by Agnew and Szykman (2005) on retirement annuity planning found that individuals suffered from information overload when presented with multiple investment choices because there are too many choices, the plans are difficult to understand and there are not many differences among the plans.

Klausegger, Sinkovics and Zou (2007) examined the nature and negative effects of information overload in relation to organisational design issues and job fulfilment and concluded with several psychological aspects responsible for information overload. The main aspects are human behaviour in extreme complex environments, human information-processing capacity and output requirements in terms of number of decisions made in high information load.

The study of Prasitratanaporn (2010) shows that personality traits such as imagination, reserve, complexity, and emotionality affect the perceptions of overload. The author suggested that information overload occurs in situations where the context of the information is unfamiliar to the reader, particularly if the information is irrelevant, ill-structured, unclear, novel, complex, ambiguous, or intensified.

Information overload is connected by two factors; firstly with the amount and nature of knowledge and skills which are possessed by processing speed and quality, and secondly the person and his or her attitude, qualification, and experience are another important factor (Li & Li, 2011). The authors classified the causes of information in terms of:

- individual factors: knowledge, skill and decision style
- work factors: information amount, work complexity and work time pressure.

Table 3.3 summarises the reasons for the causes of information overload as reported by several authors.

Table 3.3: Prior studies' findings on causes of information overload

Causes of information overload	Source
Too much information supply, too much information demand, need to deal with multi-tasking and interruption and inadequate workplace infrastructure to help reduce metacognition.	Kirsh (2000)
Causes of information overload described in 5 categories: people, technology, the organisation, processes and tasks, and information attributes	Ruff (2002)
Sheer volume of information, irrelevant information (noise), time constraints, and multiplicity of information channels	Farhoomand and Drury (2002)
Characteristics of the information, the person receiving, processing or communicating information, the tasks or processes, organisational design and information technology used in the company	Eppler and Mengis (2004b)
Personality traits such as imagination, reserve, complexity, and emotionality affect the perceptions of overload.	Prasitratanaporn (2010)
Causes of information overload classified as individual factors and work factors	Li and Li (2011)

The main causes of information overload are described next under the four categories which are depicted in Figure 3.2.

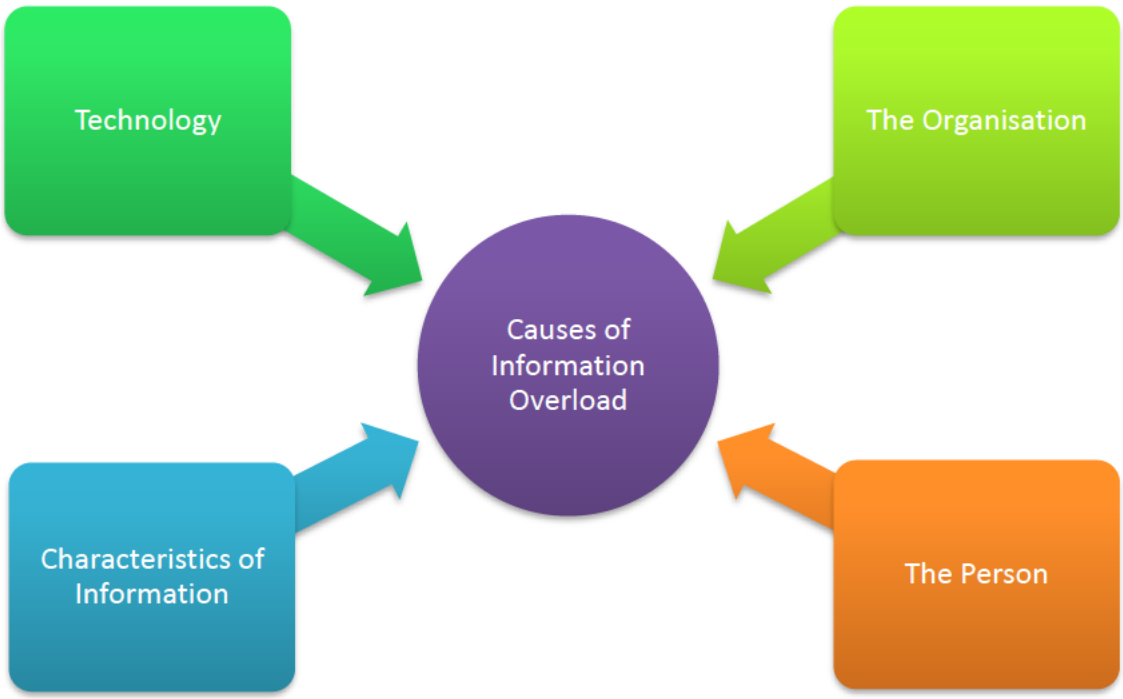

Figure 3.2: Causes of information overload

3.3.3.1 Characteristics of information

In addition to the quantity of information, the characteristics of information such as its frequency, quantity, intensity, duplication and quality are also leading sources of information overload (Eppler & Mengis, 2003; Jackson & Farzaneh, 2012).

- **Multiple sources of information**

The information age is upon us and the plethora of new sources of information continues to flourish, along with its inherent complexity (Laud & Schepers, 2009). Multiple sources of information are one of the main causes of information overload. During the last century, advances in communication systems have changed the way businesses operate, resulting in an increase in the amount of information in the workplace (Browne, 1999). According to Velez (2008), modern technology has enabled organisations to access large quantities of detailed information faster than ever before. In addition, the liberation of the telecommunications and media sectors over the past 30 years coupled with intense competition in the communication arena has resulted in decreasing costs of communication (Tambini, 2012). The drop in prices has allowed a multitude of new mobile devices, broadcast and internet services, which have fuelled the economy and more importantly benefited consumers by bringing them closer to one another (Anderson & de Palma, 2012; Tambini, 2012).

With the rapid development of computers, internet and mobile technology, information dissemination is no longer limited to newspapers, radio, television and other traditional media (Wenqian, Tong & Rui, 2011). The following are some of the modern sources of information which are adding to the information burdens of the modern worker: interaction with employees, employers, colleagues, friends via e-mail (Sparrow, 1999); mobile phones (Raoufi, 2003); blogs and rich site summary (RSS) feeds (Simperl, Thurlow, Warren, Dengler, Davies, Grobelnik, Mladenic, Gómez-Pérez & Moreno, 2010); corporate social media (Bergamaschi, Guerra & Leiba, 2010); electronic access to one's own company records via intranets (Jackson & Smith, 2011); and access to public information from the Internet (Jackson & Smith, 2011; Yamin & Ramayah, 2011).

The following are typical sources of information which are grouped by push and pull technologies that also contribute to information overload as reported in academic and business studies. There is a relation between pull and push technologies and information

overload (Franklin & Zdonik, 1998; Eppler & Mengis, 2004b). Traditionally, information was retrieved by search then pull method. With push technologies, pre-selected information sources are sent to the users without the users searching for it (Edmunds & Morris, 2000). Typical sources of information associated with information overload are listed in Table 3.4, and the push and pull technologies are explained in section 3.3.3.3.

Table 3.4: Information sources associated with information overload

Source of information	Push/Pull	Source
Interaction with employees, employers, colleagues, friends	Pull	Sparrow (1999)
Books, magazines, newspapers, radio and television	Pull	Edmunds and Morris (2000) Bergamaschi *et al.* (2010)
Mobile phones	Pull & pull	Raoufi (2003)
Social media and Web 2.0	Push	Laclavik and Maynard (2009) Bergamaschi *et al.* (2010) de la Rouviere and Ehlers (2013)
Blogs, RSS	Push	Simperl et al. (2010)
Public information like internet and intranet	Push & pull	Jackson and Smith (2011) Yamin and Ramayah (2011)
Own company records	Pull	Jackson and Smith (2011)
Information from suppliers. For example, in the hotel industry: hotel room prices, room types, airfares and available seats	Pull	Zhuang *et al.* (2011)
In the IT industry, interconnected computer hardware, software and virtualised applications generate large amounts of information in the format of messages and log files generated from servers	Push & pull	Velez-Rojas, Mankovskii, Robers, Greenspan and Kiris (2011)
Health records such as clinical reports, laboratory tests, and ordered procedures	Pull	Hsu, Taira, El-Saden, Kangarloo and Bui (2012)
Judicial folders which consist of documents and audio/video recordings	Pull	Fersini and Sartori (2012)
Billboards and newspaper adverts have been supplemented by internet pop-ups, telemarketing, and product placements within TV programmes and on football, rugby and cricket players' jerseys	Push & pull	Anderson and de Palma (2012)

It is evident from this list that employees are being bombarded with information due to improvements in technology. Information is crucial to the success of organisations and as

part of their job, employees have to cope with large volumes of information originating from multiple sources which cannot be ignored (Edmunds & Morris, 2000). The smartphone has added to this by making corporate information available in the palm of one's hands 24/7. What is worse is when an employee is provided with a company smartphone as they are expected to be contactable at all times. When does an employee switch off?

The way people search for and use information is changing. According to Brynko (2011), the content of information is no longer limited to text. Nowadays, pictures, graphs, sounds and videos are used in research, academia, and business to enrich the understanding of information. For example, e-mail is seldom a standalone information source, but often contains pointers to further information such as filed documents, links to items on the web, and references to other resources (Laclavik & Maynard, 2009).

Multiple sources of information has thus resulted in an exponential growth in the continuous and ubiquitous supply of information (Tzagarakis, Christodoulou & Karacapilidis, 2012).

- **Too much information**

Having too much information uses considerable time which is one of the major causes of information overload (Edmunds & Morris, 2000). Prior to the Internet, obtaining information was limited by time and space due to the method of transport of information (e.g. post, courier and hand delivered) (Wang *et al.*, 2012a). The Internet has removed these limitations. Individuals no longer have to wait for receipt of information as the Internet can deliver information from all over the world in seconds. According to Verdot, Christophe, Toubiana and Beauvais (2011), improvements in network technologies from the 1990s coupled with the Internet and Web 2 have resulted in exponentially increasing the amount of information users have to wade through.

Information workers across the world have to process about 300 billion e-mails, 200 million tweets, and 2.5 billion text messages resulting in an age of information superabundance (Wellmon, 2012). Figure 3.3 lists some of the social media facts, figures and statistics that give a sense of the magnitude and trajectory of the modern situation.

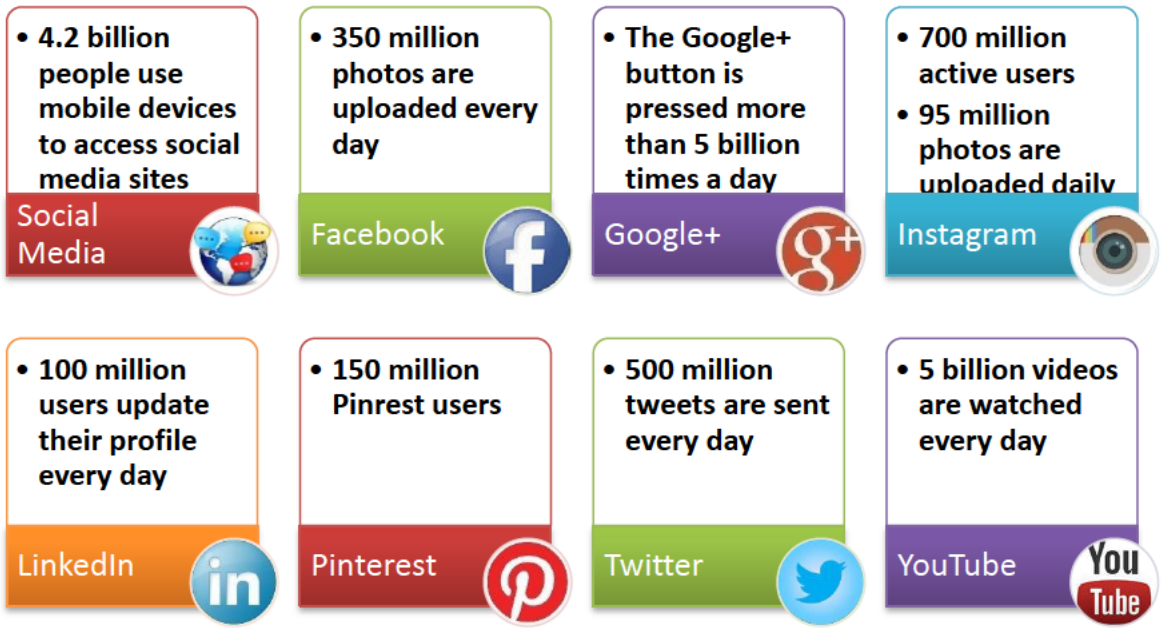

Figure 3.3: Social media facts, figures and statistics.
Source: Adapted from Ajmera (2014), Sareah (2015), Chaykowski (2016), Sayce (2016), Aslam (2017) and Donchev (2017)

With the vast amount of data being produced from the Internet, social media sites, e-mail, and instant messages, among others, a new term has emerged – Big Data (Boyd & Crawford, 2011). According to Bughin, Chui and Manyika (2010), big data are the result of greater access to customer data from public, proprietary, and purchased sources, as well as new information gathered from web communities and newly deployed smart assets. Tzagarakis *et al.* (2012) reported that in data intensive environments, collaboration and decision making are major problems as in many cases the raw information is so overwhelming that stakeholders are often at a loss to know even where to begin to make sense of it. Big data can negatively affect the effectiveness of decision making in an organisation and creates stress and cognitive overload for its stakeholders (Tzagarakis *et al.*, 2012).

Velez (2008) stated that with modern technology, transparency requirements and globalisation of markets have made more detailed and up-to-date information available to firms. The problem is that with so much information, it has increased the requirement for corporate social responsibility (CSR) reporting with corporate action to be subjected to more scrutiny. For example, enterprises now report all sorts of activities undertaken and

club them under CSR and report them in their websites and annual reports (Baxi & Ray, 2009). This is in line with Mark-Herbert and Von Schantz (2007), who reported that corporate principles are communicated to a wide set of stakeholders in various forms and communication platforms such as corporate documents, actions and media perceptions. Waddock (2008) identified over 200 sources of CSR information focusing on standards, certification, consulting, CSR memberships, social investment, CSR research, ratings and rankings, activist and NGO groups, and legislation required for a large company's performance reports. Laud and Schepers (2009) noted that there is no need for more information but there is a need for better and more intelligible information.

The large volumes of information sent are distracting employees and moreover managers are wasting time and are having difficulties developing strategies due to dealing with large quantities of information (Ruff, 2002). In contrast, in an earlier study, two-thirds of managers felt that large amounts of information are essential to back up decisions and felt they need to collect information to keep up with colleagues (Waddington, 1996). However, even when more information is available, people usually do not analyse all of it (even though they believe they do) and this extra information creates greater confidence, but it leads to lower decision accuracy as well (Zacharakis & Shepherd, 2001).

Li and Li (2011) argued that the amount of information cannot give rise to information overload individually but it should be considered within a time frame when the individual is using the information. Besides, the authors did not find a strong relationship between information overload with work efficiency and work quality. Likewise, Speier, Valacich and Vessey (1999) advocated that since information overload occurs when the amount of input into a system exceeds the processing capacity, consequently, when information overload occurs, it is likely that a reduction in decision quality will occur.

With the sheer volume of constantly increasing information, how to acquire useful information quickly and effectively has developed into a major problem (Yuanliang, Boyi & Hongming, 2011).

- **Information quality**

According to Wenqian *et al.* (2011), search engines solve the basic needs of information retrieval, but they cannot track the latest information in the most timely and effective way.

Therefore, only some of the information retrieved is relevant or important which highlights the third characteristic of information causing overload which is the irrelevance or unimportance of information. This suggests that it is getting more difficult to actually determine what information is actually relevant and important. Irrelevance and importance of information are categorised under information quality.

Quality can be defined as meeting and exceeding expectations (Malá et al., 2013). Information quality and some of its important attributes such as relevance, accuracy, completeness and timeliness were described in Section 2.7.4. Zhuang et al. (2011) emphasised that logically, clearly presented information from a trusted source relevant to the task at hand is less likely to cause overload than a piece of ambiguous information from a questionable source. Multiple aspects of quality of information might trigger information overload as reported by several authors and presented in Table 3.5.

Table 3.5: Quality of information that might cause information overload

Aspects of information quality that can cause information overload	Reference
Uncertain, ambiguous, novel, complex or intense	Schneider (1987)
Accessibility, contextual, and representational	Wang, Lee, Pipino and Strong (1998)
Diversity	Bawden (2001)
Veracity and reliability	Bawden and Robinson (2008)
Clarity, uncertainty, and lack of credibility	Zhuang *et al.* (2011)
Information duplication	Jackson and Farzaneh (2012)
Age and technology	Benselin and Ragsdell (2016)

Mosig (2012) found that identifying relevant information is a major problem faced by decision makers as they are constantly bombarded by useless information. Medical practitioners face the same challenge as a large and irrelevant amount of information is disseminated to them especially when they require information to help them in making medical decisions for an individual patient's situation (Hsu *et al.*, 2012). Overload has been known to arise in areas of project management, marketing, communication, healthcare and tourism (Eppler & Mengis, 2004b; MacDonald *et al.*, 2011; Park & Jang, 2012). Since only a very small part of the masses of online information is required, people have to spend a lot of time to find and integrate the information they need (Wenqian *et al.*, 2011), as such people need more personalised information. Benselin and Ragsdell (2016) found a

correlation between age and technology use which resulted in differing rates of information overload among the older ages and younger ages. Benselin and Ragsdell (2016) added that not having time to reflect or absorb was stated by the younger age groups as a cause of information overload.

There has also been an increase in the amount of information about sustainability and environmental issues in general (Cohen & Santhakumar, 2007; Moisander, 2007) and in addition this have given rise to interest in how green consumers especially are likely to react to this information when purchasing products (Young, Hwang, McDonald & Oates, 2010). While people's perceptions and views about sustainability are likely to be formed through a compound range of information sources, a variety of communication and social processes (Kolandai-Matchett, 2009) have increased the risk of information overload (Strother & Fazal, 2011). Furthermore, bombarding the community with similar green messages, or overloading the same messages, drowns these messages in the sea of irrelevance (Strother & Fazal, 2011).

Chen, Shang and Kao (2009) found that due to online e-retailers flooding consumers with rich information (containing details such as text, graphics, audio and video), the consumers are subjected to information overload which in turn has the strong possibility of leading to consumers making low quality purchasing decisions. This is in line with Lee and Lee's (2004) findings that the structure of information, as determined by the type of distribution of attribute levels across alternatives, has a direct impact on the amount of information that consumers need to process.

There is also an abundance of low quality information which Shenk (1998) called "data smog". This overabundance of low quality information has been facilitated by the ease and low cost of sending messages (Heylighen, 2002). For example, sending fragments of messages to thousands of people within minutes by using e-mail has resulted in an outbreak of irrelevant, unclear and flawed data. In an earlier study, Heylighen (1999) compared the emergence and effects of data smog to the pollution of rivers and seas caused by an excess of fertilizers, or to the health problems caused by a diet too rich in calories. Junk e-mail messages, spam, chain letters, crackpot opinions, or scams that are

distributed automatically to millions of e-mail addresses which have been harvested from a variety of sources are all considered to be data smog (Heylighen, 2002).

The quality of information can impact on an individual's information-processing capacity because individuals can use high-quality information quicker and better than uncertain, ambiguous, novel, complex or intense information (Schneider, 1987). Information processing capability is very subjective as individuals differ in their information-processing ability which in turn affects their level of information overload. However, information overload is not merely about having more information available, or having the technology deliver more than we essentially need; human factors also need to be considered. The next section reviews the causes of information overload in terms of the second category, people.

3.3.3.2 The person involved in handling the information

The definition of information overload by Edmunds and Morris (2000) has drawn attention to the fact that the daily amount of information is produced faster than people can process it which causes loss of control of the situation. Likewise, Wilson (2001) described information at the personal level as: "a perception on the part of the individual or observers of that person, that the flow of information associated with work tasks is greater than can be managed effectively, and a perception that overload in this sense creates a degree of stress for which his or her coping strategies are ineffective".

As previously mentioned, information processing and the quality of decision making are affected by the increasing amount of information. The point where information processing has reached its peak, and just prior to declining, is the individual's capacity for information processing (Malhotra, 1984; Ruff, 2002; Eppler & Mengis, 2003). In Figure 3.4 this is visually presented as an inverted U-curve plotting decision accuracy (y-axis) against the quantity of information (x-axis).

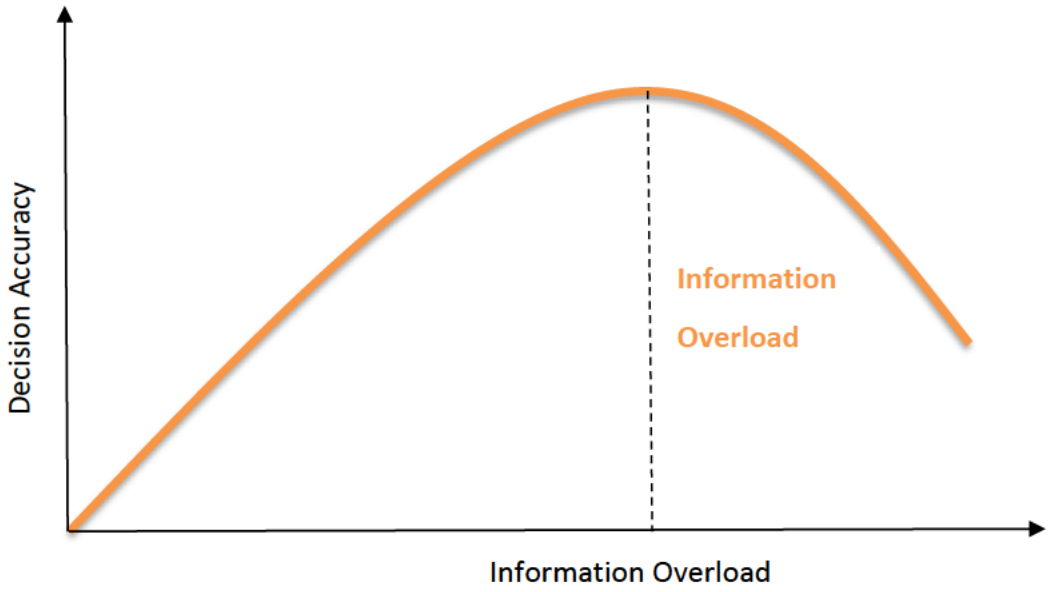

Figure 3.4: Information overload as the inverted u-curve
Source: Adapted from Eppler & Mengis (2003)

Information overload occurs at various points depending on individuals as everyone possesses a limit for information processing. Furthermore, the level of information overload varies throughout the stages of a project, and the sources of the overload also change with these stages according to research on construction project managers (Heylighen, 1999).

According to Millar (1956 as cited in Klausegger *et al.* (2007)), the natural limit to mental processing in the short-term memory is thought to be only between five and nine "chunks" of information before information overload sets in. Unless people can extensively programme their behaviour, they waste tremendous amounts of information-processing capacity on trivia (Toffler, 1970).

- **Information processing requirement**

There have been multiple definitions of information overload and some of them include the information-processing requirement as one of its causes. For example, in an early research by Schick *et al.* (1990), they stated that information overload occurs for an individual when the information-processing requirements on time (information load) to perform information processing surpass the available time (information-processing capacity) for such processing. Basically, Schick *et al.* (1990) applied the concept of time to

an analysis of information overload founded on the information-processing approach to organisation design. Information processing time is defined as the time spent interacting with peers and stakeholders, and time to perform internal information processing, such as thinking, reading, planning, problem finding, problem solving, implementation and review (Haksever, 2000). Haksever (2000) used time and information processing to define information overload; information overload occurs in an individual when the information-processing demands on time to perform information processing exceed the supply of time available for such processing.

It is difficult to measure information overload and information-processing capacity as it depends on multiple factors which include both the individual and the information itself. O'Reilly (1980) wrote that assessing information overload with individuals requires more subjective appraisals, capturing not only judgments about ability to process but also preferences information-processing requirement and satisfaction for the task on hand. He added that studies on overload at the individual level should capture differences in individual processing capacities, work environments, and personal desire for information. Information processing capacity is influenced by education, training, experience and motivation as well as the psychological makeup of the individual (Ruff, 2002). The perception of overload amongst information seekers varied according to socio-economic status such as education, income and employment status (Kim, Lustria, Burke & Kwon, 2007). Bergamaschi *et al.* (2010) similarly added that an individual's skill as well as the motivations and goals behind the information request affect the measurement of information load and information-processing capacity.

Information overload therefore occurs when an individual needs to process information in excess of what he or she can. That is, information overload occurs at an individual level when the information load surpasses the individual's information-processing capacity. Moreover, personal traits of the individual are another factor influencing the perception of information overload.

- **Personal traits**

The person and their attitude, mood, education, training, experience, motivation, goals, income and employment status are the attributes for determining the level of information

overload. As mentioned in the previous section, personal traits affect the information-processing capacity of the individual.

Research in psychology has shown that mood is another attribute that may mediate the effects of information overload. People in a positive mood perform better than their control counterparts under the conditions of information overload (Djamasbi, 2003).

Although Eppler and Mengis (2003) stated that personal traits only directly affect the information-processing capacity, de Bakker (2007) suggested that individuals also determine their own information load. For instance, in information centred organisations, managers are normally in need of cognition and, consequently, will tend to acquire more information.

According to Wilson (2001), the more uncertain the managers, the more they will be driven to acquire information as they have a higher need for cognition. For example, new employees may experience high levels of uncertainty during their organisational entry, as they have to learn about their new job requirements, expectations and the organisation itself. There is always a possibility that these new employees will perceive a higher information need than longer employed members within the organisation (Roberts, 2014).

There is equally the risk of star employees (top performers with high internal and external social visibility) producing an unintended side effect of information overload (Oldroyd & Morris, 2012). This is in line with Lechner, Frankenberger and Floyd (2010) who stated that star employees have loads of social capital and thus have access to many contacts which leads to higher information exchanges that have much benefit to the performance of strategic initiatives. However, at some point, the time devoted to maintaining an existing network of strong ties is no longer worth the effort relative to the information and other resources obtained (Lechner *et al.*, 2010).

An earlier study by O'Reilly (1980) reported that due to the fact that it is not always clear what information will be needed or when it might be useful, employees may gather a large amount of information with the possibility that a portion of it might be important at some future time. For example, employees sometimes seek to gather together relevant information so that it is in one place and can be viewed, quite literally, at the same time

(Jones, 2004). In addition people want to receive lots of e-mail because it sustains their self-image of being important (Zeldes, 2012). Consequently, gathering of information makes an individual a determinant of information overload alluding that the individual seems to influence the information load (de Bakker, 2007).

Research by Li and Li (2011) on managers with at least five years of experience revealed that work efficiency and work quality are both not strongly connected with information overload. The authors found work interruption and work time pressure to be the main causes of information overload and not the mass of information.

- **Lack of time to understand information**

Lack of time to understand information is another cause of information overload. There is not enough time for users of information to use the available information properly in order to take corrective action for situation assessment and decision-making tasks (Detsis, Dritsas & Kostaras, 2001). Heavy information load has a negative impact on an employee's work performance when measured in terms of accuracy and speed (Eppler & Mengis, 2004b). Due to time pressures, workers do not have sufficient time to handle all of the information retrieved/received (MacDonald *et al.*, 2011).

Franz (1999) suggested that it takes less time to access information but more time is required to make decisions as the decision maker should take time to understand the mass of information first. Moreover, processing large volumes of information can be time consuming and thereby cause stress which subsequently affects decision making (Edmunds & Morris, 2000). Paul and Nazareth (2010) studied the effect of information complexity on information processing among decision makers and demonstrated that more complex information and time pressure may cause information overload.

The study by Karr-Wisniewski and Lu (2010) on knowledge workers discovered that workers wasted a lot of time responding to e-mails and voicemails that were business-related but not directly related to a task at hand. A knowledge worker is a participant in the knowledge economy (Spira & Goldes, 2007). The knowledge economy as an economic environment where information and its manipulation are the commodity and the activity compared to the industrial economy where workers produced a tangible object with raw production materials and physical goods (Spira & Goldes, 2007). Furthermore, (Karr-Wisniewski & Lu,

2010) found that workers were often overwhelmed since technology had allowed too many other people to have access to their time. For instance, there are too many technologies readily available, such as e-mail, fax, phone, instant message, skype and twitter tweets which can interrupt people while they are busy.

- **Other personal factors**

Whittaker and Sidner (1996) demonstrated an important aspect of personal information management, such as screening and filtering of cluttered user inboxes containing hundreds of messages, including outstanding tasks, partially read documents and conversational threads which also create e-mail overload. Zandt (2004) showed that as a result of low communication costs for generating and transmitting information, there is inadequate screening of messages by senders before sending messages. This insufficient screening of outgoing messages by senders is another personal factor that causes information overload that Eppler and Mengis (2004a) added to their extensive research. The authors additionally found personal situations such as time of the day, noise, temperature, amount of sleep to add to information overload. For example, Collins (1977) reported that sleep deprivation could affect processing abilities. O'Reilly (1980) found that decision makers can also be subjected to more pressures, distractions and noise at various times of the day that can reduce their ability to process information.

Ruff (2002) suggested the following personal factors that might be responsible for information overload:

- Poor writing skills of information sender (requiring rewriting and resending the same message for clarity)
- Packrat mentality: saving everything (causing cluttered inboxes and piles of paper)
- Subscribing to too many online periodicals
- Attraction to technology and using it to add to rather than reduce information overload (e.g. desktops, laptops, smartphones and tablets)
- Defining the abundance of information as a problem rather than part of the job

Griffiths (2010) found that internet abuse and internet addiction in the workplace can also be a potentially serious cause of information overload. Personal usage of the Internet in the job environment, commonly known as cyberloafing, is seen as one of the most frequent counterwork behaviours (Derin & Gökçe, 2016),

Zeldes (2012) surveyed and interviewed knowledge workers from 1994, listed the "the secret cause of information overload" as diverse yet related reasons for the destructive messaging behaviours he had seen in organisations which include the following:

- People want to impress others – notably their boss – by showing e-mail activity at all hours.
- People are reluctant to go off distribution lists for fear of being left out.
- People stay on lists for fear of offending the sender if they ask to "unsubscribe".
- People insist on producing redundant status reports, and their boss condones this for fear of offending them.
- People send unneeded e-mail to create a "paper trail", to cover themselves in case of future disagreement or finger-pointing.
- People copy an action request to the recipient's manager, either as a pressure tactic or as a veiled threat of future escalation.
- People react to the beep of their smartphones at all hours, because they perceive an unstated expectation that one must reply to e-mail/messaging instantly – or be stigmatised.

Toffler (1970, p. 235) stated "For unless we can extensively program our behaviour, we waste tremendous amounts of information-processing capacity on trivia".

The following section describes technology as the other factor impacting on information overload.

3.3.3.3 Technology

As stated earlier, advances in information and communication technology have made information abundant and easy to exchange and reproduce and this plays a significant role in the cause of information overload. It not only helps to create content information, it also presents access to measureless volumes of it. Learning how to use technology introduces still more information with which to contend. Eppler and Mengis (2004b) stated that information technology and its use and/or misuse are a major reason why information overload has become a critical issue in many organisations since the 1980s.

Advances in technology have produced infinite new sources and innovative ways of exchanging information: voice and video phone calls, e-mail, social network sites, RSS, SMS, MMS and instant messaging. Furthermore, these innovations in technology have multiplied the alternatives to be contemplated and have increased the amount of information that the individual needs to learn and understand. According to Bawden *et al.* (1999), by the 1990s, information overload began to be referred to as a major problem particularly with the development and deployment of new technologies such as e-mail and the Internet. Veel (2011) added that the ability of digital technology to compress enormous amounts of data means that on one hand, there is an inclination to accumulate information, which entails the danger of overload, and on the other hand, the challenge exists of being able to appraise and select valuable information.

Heylighen (2002) stated that with extra information, more effort is required to cope with its accompanying stress. This stress which is referred to as information fatigue syndrome reduces the productivity of employees and increases the probability of errors and ineffectual use.

Pull and push technologies are strongly linked to e-mail overload (Eppler & Mengis, 2004b). The traditional method of retrieving information was to search and pull. Push technologies, on the other hand, work by pushing notices of pre-selected information sources across the computer screen alerting users to new and updated information (Edmunds & Morris, 2000). There is always the danger of adding to information overload; if the person 'pushing' the information does not have a good understanding of the information requirements of the recipient, unsolicited information may be pushed (Rochat, 2002). Edmunds and Morris

(2000) stated that even if pushed information reduces information retrieval time it still increases the amount of useless information.

There are, however, also arguments in favour of communication technologies. Filippov and Oiastrebova (2010), for example, reported that it is not the technology but the lack of discipline or incentives in information sharing and the loose culture of knowledge sharing within organisations that can cause information overload or information poverty. For example, some people are stimulated by streams of information which is referred to as information addiction (Hemp, 2009; Varga, Simovic & Milkovic, 2013). It difficult for people to overcome an information addiction without help, but in the end, it is up to them to take control of the information problem. Likewise, Andreou and Svoli (2013) added that intervention strategies to information and internet addiction should first consider the individual and then other external factors. Information and internet addictions which are behavioural addictions, share some commonalities with substance-based addictions and have profound implications for treating such conditions (Pontes, Kuss & Griffiths, 2015).

Therefore, technology alone cannot be blamed for information overload. Karr-Wisniewski and Lu (2010) found support for factors which are functions of the individual who uses technology (not the technology itself) that contribute to information overload. These three factors are as follows:

i. Human interruption theory: Excessive interruptions in a person's job to the point the knowledge worker becomes less productive.

ii. Cognitive load theory: A knowledge workers' productivity may be impeded by system feature overload when the given technology is too complex for a given task.

iii. Information processing capabilities: Information overload occurs when an individual is presented with more information than the individual has the time or cognitive ability to process or, in other words, when an individual's information-processing capabilities are exceeded by the information-processing requirements.

Making reference to published work, Eppler and Mengis (2004b) reported intranets, the Internet, increases in the number of television channels, low duplication costs and speed of access to be some of the major sources of information overload. Ruff (2002) found the

use of unnecessary technologies, over reliance on technology, and poor integration of various technologies to be "technology" causes of information overload.

The exploding quantity of user created content on social media has worsened information overload and left content control and management largely up to users (Koltay, 2011). On social media sites (Facebook, Twitter, LinkedIn, Tumblr, etc.) especially with microblogging services, information overload is worsened when a user follows too many other users (people, pages, etc.) (de la Rouviere & Ehlers, 2013).

Digital databases, digital storage systems and digital archiving systems are other technologies causing information overload. With digital databases and digital archive systems, the same information could be made accessible in more than one context which implies an increase in the number of possible combinations of data. In an article by Veel (2011), the organisation of information in archives or databases is invariably related to issues of information overload – a situation where databases are designed to counteract at the same time as they contribute to it.

The technological infrastructure of a company as a whole can be inadequate to the needs of modern information dissemination and information handling (Allen & Wilson, 2003). For example, in an environment with multiple distinct unconnected technological platforms, lack of coordination in information technology planning can often result in information overload. Furthermore, more information technology usage in the workplace can, at times, lead to productivity losses (Karr-Wisniewski & Lu, 2010). This means that the added technology introduced crowds out the individual's productivity as opposed to enhancing it.

According to Wilson (2001), it is not technology that causes information overload, but it is its misuse that contributes to the problem. The author mentioned advertising e-mail 'spam' as an example. Research by Hall and Walton (2004) suggests that the effective use of information and knowledge depends not only on technology but that there must be the appropriate organisational structure in place to counteract information overload. The volume of data generated by new information technologies in recent years has had significant adverse effects on individuals and organisations alike (Klausegger *et al.*, 2007).

3.3.3.4 The organisation

Research in information overload presented at the individual level has exposed the issue at technological and behavioural levels. Equally, at the organisational level, information overload is defined as a situation in which the extent of perceived individual information overload is sufficiently extensive within the organisation as to reduce the overall efficacy of management operations (Wilson, 2001). Grisé and Gallupe (1999) found that the problem of information overload goes beyond human processing capacity and has far-reaching effects on groups, organisations, and society in general. This is in accordance with Schneider (1987) who advocated that information processing is affected by several organisational aspects, such as levels of differentiation and integration, organisation design and politics, ideologies, and frames of reference.

Jackson and Farzaneh (2012) described the relationship between individual information overload and organisational information overload as an intrinsic one. In an organisation, multiple individuals constantly and iteratively produce and consume information and thus augment the organisation's information sources as shown in Figure 3.5.

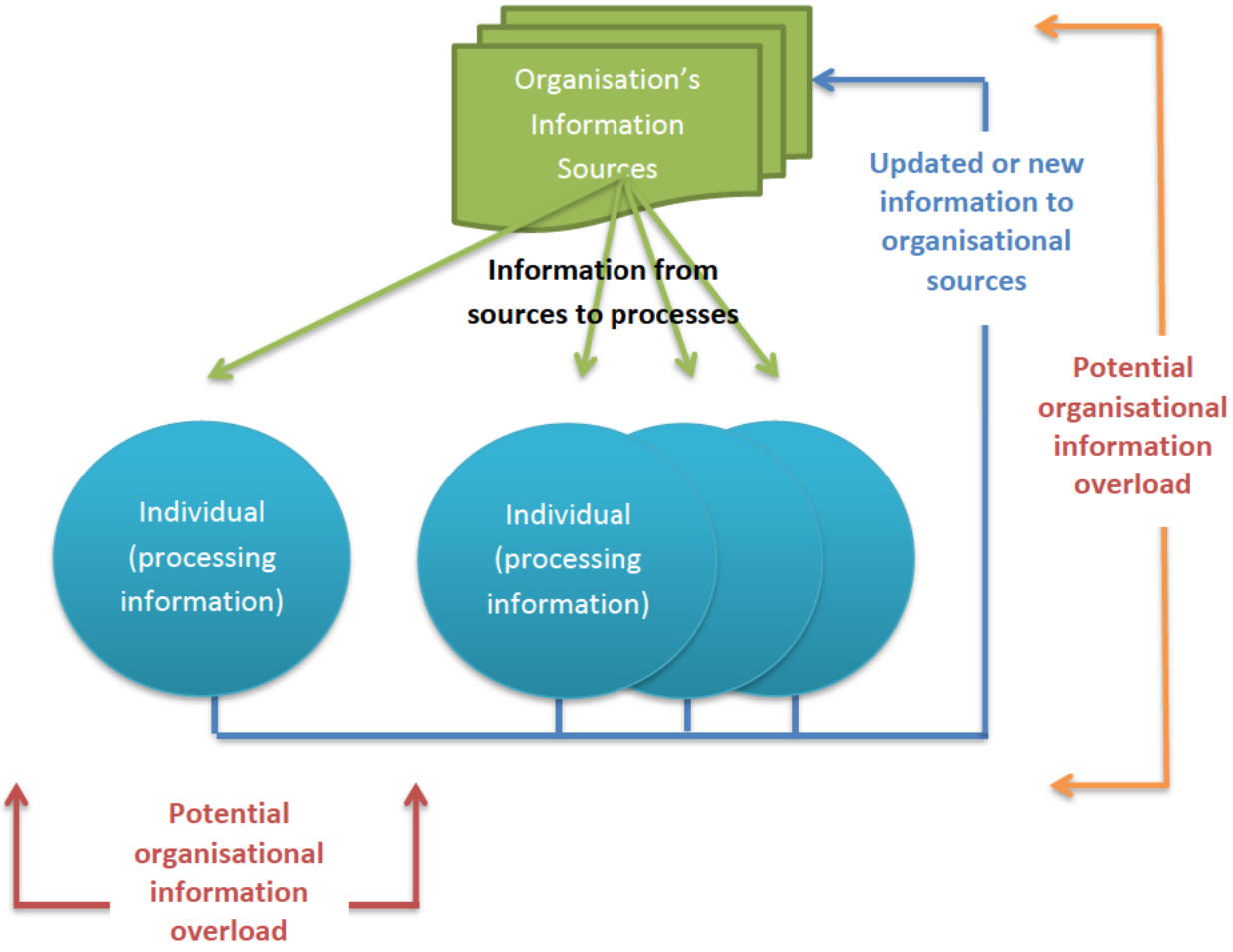

Figure 3.5: The impact an individual has on information overload within an organisation and vice versa
Source: Adapted from Jackson & Farzaneh (2012)

Information overload at the organisational level is greater than the sum of individual information overload (Heylighen, 2002; Lincoln, 2011). For example, because of non-linear interactions, increasing overload in one part (individual) does not altogether lead to a proportional increase in the overall (organisation) overload. According to Sparrow (1999), "organisations are highly dependent on the complex knowledge that resides within the net sum of an organisation's employees - their experiences of events, projects, knowledge of clients and contacts, their awareness of decision-making styles and their assumptions about working practices and relationships". Therefore, the sum of successes of the individuals contributes to the success of the company and similarly the sum of the failures of the individuals contributes to the failures of the company.

Moreover, Filippov and Oiastrebova (2010) stated that with an abundance of information in organisations (groups of interacting individuals), information can actually be diffused over the wide array of personal repositories (individuals) with no way to link it into a single, meaningful piece. But reciprocally, frequent changes in the role of employees and their environments increase task complexity which in turn increases the requirements on information (Allen & Wilson, 2003).

- **Globalisation, centralisation and downsizing**

Eppler and Mengis (2004b) reported that a critical issue that affects the incidence of information overload is the organisational design of the company. For instance, with globalisation and centralisation there is a need for more intensive communication and coordination which necessitates more information-processing requirements which in turn can introduce information overload (Bawden, 2001; MacDonald *et al.*, 2011).

Globalisation has introduced challenges which are associated with the need to coordinate the work of people from diverse cultures and located in different countries, so that they can successfully do their jobs. This has in turn resulted in additional communication and information. The survey of Kock *et al.* (2008) on global companies in the US and New Zealand show that employees perceived information overload as negatively affecting their work-related productivity and quality.

In an organisational context, as described by Prasitratanaporn (2010), information overload occurs frequently in centralised organisations as information systems and business processes become more integrated. Conversely, improving organisational design with better standards, common procedures and rules can decrease the information-processing requirements and therefore reduce information overload (Schick *et al.*, 1990).

Another facet of organisational structure that has been documented in the literature as a possible cause of information overload is downsizing, that is cutting the staff of an organisation to the irreducible minimum. From Allen and Wilson (2003) point of view, with companies downsizing, fewer secretaries are employed which normally leads to fewer staff dealing with rapidly same increasing amounts of information, thus causing information overload. Furthermore, downsizing sometimes creates a situation for individuals to defend positions and often this is done by hoarding information. For example, since information is

crucial to businesses, especially in difficult times, people often feel they have to constantly keep up to date and receive more and more information (Edmunds & Morris, 2000; Ingham, 2003). Equally, in a shrinking workforce, the remaining employees may be expected to execute more tasks they usually do not take part in thus exposing them to more information (Fong & Kleiner, 2004).

- **Groups and teams**

Business and management communication is vital for corporations to achieve their goals and thereby meriting recognition as a specialty in itself (Verčič, Verčič & Sriramesh, 2012). Similarly, internal communication among staff and management is useful and necessary for corporations and businesses as it can promote employee awareness of opportunities and threats, and develop employee understanding of their organisation's changing priorities (Welch, 2012; Markaki, Sakas & Chadjipantelis, 2013).

There are many types of internal communication ranging from informal chat and office gossip, to formal corporate communication and formal and informal communication between teams (Welch, 2012). For teams working in complex task environments, instilling effective communication between team members is crucial (Whetzel, Forsythe, Glickman & Haass, 2013). Developing an effective communication plan among team leaders and employees is a difficult process but extremely valuable as it helps the organisation, conservation and dissemination of the communication process (Markaki *et al.*, 2013).

In addition to e-mail, telephone and fax, collaboration technologies (such as blogs, videoconferencing, wikis, online forums, Web 2.0, etc.) have enhanced the ability of work groups to acquire and share large volumes of information within a short period (Paul & Nazareth, 2010). The processing of voluminous information is challenging and may lead to conditions of information overload within individuals and groups (Paul & Nazareth, 2010).

Haksever and Fisher (1996) suggested that the increase in information has resulted in fragmented expertise, and consequently increasing the need for co-ordination, integration, control and in particular, communication. In their study on idea-organisation tasks in a face-to-face electronic meeting, Grisé and Gallupe (1999) claimed that as computer-supported groups are confronted with larger numbers of ideas and supporting comments to organise and evaluate, they tend to experience information overload. The reasoning is that groups

that are extremely productive in the idea-generation phase of a meeting may find themselves overwhelmed by a flood of ideas and comments to organise. Following the same idea, Kock *et al.* (2008) asserted that in virtual teams and virtual organisations, using electronic modes of communication that are less natural than face-to-face communication, the situation can often lead to an increase in communication ambiguity. Further problems experienced with face-to-face communication are the increased decision time for solving problems and the unavailability of subjects (Ean, 2010). Zhuang *et al.* (2011) found that a fluid team structure together with low levels of job standardisation added to the overload problem.

- **Tasks and processes**

Office work is no longer straightforward and procedural. These days, the workspace is a complex knowledge environment due to new technologies and team dynamics (Kirsh, 2000). The ease and speed with which employees at all levels can access and disseminate novel information through new communication technologies has resulted in a more complex information-processing environment (Whelan & Teigland, 2010).

Information overload is dependent on not just the flow of information and ideas, but on the operating processes and tasks that need to be performed. For example, information overload can be caused by simultaneous input of information into the process (Grisé & Gallupe, 1999). As the complexity of a process or task increases, so does the information load and the time required to complete it (Ruff, 2002). A large amount of low-quality information has the ability to increase the complexity of a task to the point that information overload occurs (Gao, Zhang, Wang & Ba, 2010).

Simple tasks require less processing by the individual compared to complex tasks and will not affect the processing capacity of the individual (Speier *et al.*, 1999). Besides, there is a relationship between task complexity and cognitive complexity (Batra, 2007). From a cognitive load perspective, van Gog, Paas, Savenye, Robinson, Niemczyk, Atkinson, Johnson, O'Connor, Rikers, Ayres, Duley, Ward and Hancock (2008) defined complexity by the number of interacting information elements a task contains, which have to be simultaneously processed by an individual. For instance, simple tasks get completed faster than complex tasks which according to the definition will require a higher number of interacting information elements with the possibility of information overload (Rigas &

Alharbi, 2011). Therefore, from the definition of complexity, it can be said that complexity is influenced by individual experience; a novice may find a simple task complex and likewise an expert may find a complex task simple (van Gog *et al.*, 2008). This, in turn, confirms people as being another factor in information overload.

Several researchers also confirmed that not having standard tasks and process parameters contributed to information overload (Schick *et al.*, 1990; Bawden, 2001).

Interruption is another factor that can aggravate information overload (Speier *et al.*, 1999; Li & Li, 2011). Jackson, Dawson and Wilson (2003) defined an interrupt as ‘‘any distraction that makes a person stop his planned activity to respond to the interrupt’s initiator’’. Jackson *et al.* (2003) also stated that the three main types of interrupts are personal visits, telephone calls and e-mails. Quoting several researchers, Oldroyd and Morris (2012) showed that information technology has increased the number of interruptions from information requests. For instance, electronic communication has intensified the frequency with which people interact and interrupt one another at work. Research on employees at Microsoft on e-mail habits revealed that once their work had been interrupted by an e-mail notification, people took, on average, 24 minutes to return to the suspended task (Hemp, 2009). According to Jackson *et al.* (2003), most employees checked for incoming e-mail messages every five minutes and responded to the arrival of a message within six seconds. Yet, e-mail interruption can be controlled. Even if an e-mail alert may intrude upon consciousness, people have the power to make the decision on when, whether and how to respond to the interruption (Russell, Purvis & Banks, 2007).

The type of decision-making approach within an organisation strongly impacts the level of information overload within an organisation (Bettis-Outland, 2012). Decision makers may be unable to find what they need most due to sheer volume, even causing them to omit what they themselves would consider critical (Farhoomand & Drury, 2002). They also stated that information overload may cause decision makers to fail to use the available information, leading to the inefficient use of decision-making time. MacDonald *et al.* (2011) expressed a similar view, stating that with increased quantities of various kinds of information, more time was required to make a decision with poorer decision accuracy. Furthermore, with continuous extra information, decision quality declines and the time

needed to make the decision increases (MacDonald *et al.*, 2011). Bettis-Outland (2012) similarly reviewed various research findings and she summarised the type of approaches impacting on the level of overload as: (1) the volatility in business markets, necessitating quick response to changes in the marketplace; (2) competitive pressures that require continuous scanning of the environment; and (3) uncertainty, which is a hallmark of contemporary business interactions. Himma (2007) pointed out that uncertainty about important decisions creates stress and anxiety that can distract employees from other things they should be doing or thinking about.

- **Other factors contributing to information overload**

In addition to the causes already listed, Kirsh (2000) added multi-tasking to the list of causes of information overload. Multi-tasking basically means interrupting one task with another. Since people simultaneously engage in many tasks, interact with each other and with their tools, this can often lead to interference. Even senior executives multitask when they disjointedly attempt to grab spare moments with their laptops or smart phones, and this multitasking is a vain effort to keep pace with the information flowing towards them (Dean & Webb, 2011).

According to Bawden *et al.* (1999), when the greater proportion of information searching is done by end-users rather than information officers, this can contribute to information overload. The authors presume that users are less skilled than the information officers at rapidly identifying the necessary information from the sheer quantity, and hence may feel more overloaded.

The nature of work carried out by the employee can also contribute to information overload (Wilson, 1996). For instance, Bawden *et al.* (1999) reported interdisciplinary work increasingly common in many working environments, as a clear trigger of overload.

Ruff (2002) added the following personal factors that might be responsible for information overload to the ones described earlier in this chapter:

- Confusion as to best practices for completing tasks
- Unclear goals or tasks
- Inability to recognise when the task is complete.

Filippov and Oiastrebova (2010) demonstrated that information overload at the organisational level is likely to emerge because of the interaction among a wide range of organisational, task-related, and human-related factors.

This section on the causes of information has shown that the root cause of information overload is the characteristics of information such as its frequency, quantity, intensity, and quality (Zhuang *et al.*, 2011; Wellmon, 2012; Malá *et al.*, 2013). The stress on individuals created by modern management practices and new technologies which increase the general workload or otherwise create defensive behaviour is another leading cause (Wilson, 2001; Veel, 2011). A range of factors related to tasks and the processes that need to be completed were identified. These factors comprise task novelty, task complexity, multi-tasking, task interruption, interdisciplinary work and decision making (Grisé & Gallupe, 1999; Whelan & Teigland, 2010; Rigas & Alharbi, 2011). At the organisational level, the level of information overload is more than the sum of individual information overload (Heylighen, 2002; Lincoln, 2011). This means that there is an inherent relationship between personal and organisational information overload. In addition, company structures such as globalisation, centralisation and downsizing as well as groups and teams have intensified the amount of communication and coordination and information-processing requirements, resulting in information overload (Kock *et al.*, 2008; Prasitratanaporn, 2010; MacDonald *et al.*, 2011).

Table 3.6 summarises the reasons for the causes of information overload as presented in this section.

Table 3.6: Causes of information overload

Characteristics of information	The person involved in handling the information
• Multiple sources of information • Too much information • Information availability (quantity, quality, saliency, content, form and credibility) • Uncertainty of information (info needed vs. info available) • Diversity of information and increase in number of alternatives • Ambiguity of information • Novelty of information • Complexity of information • Over-abundance of irrelevant information • Unknown reliability of source of information • Unknown context from which information was derived	• Information processing requirement • Personal traits (experience, skills, ideology, age, motivation, attitude) • Lack of time to understand information • Senders screen outgoing information insufficiently • Packrat mentality – saving everything • Playing safe and get all information possible • Impressing others by showing e-mail activity at all hours • Reluctance to go off distribution lists for fear of being left out or offending sender • Insisting on producing redundant status reports, and their boss condones this for fear of offending them • Sending unneeded mail to create a paper trail, to cover themselves in case of future disagreement
Technology	**The organisation**
• New information and communication technologies • E-mail • Intranet and Internet • Push systems • Rise in number of television channels • Various distribution channels for the same content • Introduction of more technology than is required • Over reliance on technology • Poor integration of various technologies • Low duplication costs • Speed of access	• Globalisation, centralisation and downsizing • Groups and teams • Tasks and processes • Low level of job standardisation • Decrease in task performance with increased information • Failure to achieve a balance between task requirements and processing capacity • Time needed to process information exceeds available time • Disintermediation (information searching is done by end users rather than by information professionals)

Source: Edmunds & Morris (2000), Wilson (2000), Eppler & Mengis (2004a), Zhuang *et al.* (2011), Jackson & Farzaneh (2012) and Zeldes (2012)

To gain a deeper understanding of the phenomenon of information overload, it is necessary to analyse the impact of relevant literature in various functional areas and management domains.

3.4 INFORMATION OVERLOAD IN FUNCTIONAL AREAS

The concept of information overload has attracted researchers from multiple disciplines which include: financial markets (Velez, 2008), aviation (Deveans & Kewley, 2009), business (Simperl *et al.*, 2010), information technology (Fowler & Hammell, 2011), university libraries (Israel, 2010), and most recently, medicine (Hsu *et al.*, 2012). This multi-disciplinary interest in information overload suggests that it is an important concept that needs greater attention which includes understanding its source, its effects and how it needs to be managed.

Eppler and Mengis (2003) reported that there are four key areas in which information overload research has been primarily conducted in the last thirty years, namely accounting, marketing, organisational behaviour, and management information systems (MIS). Lengnick-Hall and Lengnick-Hall (1988) and Schick *et al.* (1990) conducted research on information overload in the field of human resource management.

An overview of information overload in these five areas makes it possible to show schools of thought or controversial discussions and the level of transfer between them. The intention is not to discuss all the articles per discipline, but to illustrate the key contributions to the information overload debate within these five disciplines.

3.4.1 Marketing

The topic of information overload within marketing, or more specifically within consumer research, has become crucial since the number of consumer brands exploded in the early 1970s.

Eppler and Mengis (2003) summarised articles on information processing and information overload within marketing from 1956 to 2000 and found that most of the research was of an empirical nature and very little was done at a conceptual level. The authors also drew

attention to the fact that the research in the field of marketing focuses on the impact of information overload on decision quality, decision time, and on the actual number of information items that can be processed in a typical purchase situation.

For example, the empirical study of Malhotra (1984) argued that consumers can be overloaded when provided with more than ten choice alternatives. With excessive available information or difficult to understand information, consumers tend to ignore a good deal of information which may result in suboptimal or unsatisfactory choices and hence they experience information overload (Malhotra, 1984). Malhotra (1984) found that a number of brands and their attributes (information overload) influenced consumer product choices.

The number of daily advertising messages the average American encounters increased from 560 daily in 1971, 3000 daily in 1997 to 5000 in 2012 (Anderson & de Palma, 2012). These high figures are due to the fact that consumers are exposed to hundreds of commercial messages per day in one form or another – radio commercials, newspaper adverts, billboards, on the side of the bus, every time one passes by a label in a grocery store, labels on everything one wears, and then as e-mail and social media posts. Anderson and de Palma (2012) added that at the same time, though, consumer retention rates for adverts remain low. For example, how many advertisements do we remember from the past day?

Park and Jang (2012) held the view that in the tourism industry, according to the choice overload concept, having too many choices can occasionally result in consumers making 'no choice' or experiencing increased perceived regret. In addition, their results showed that having more than 22 choices increased the likelihood of making 'no choice'. However, the study also demonstrated that when too many choices were provided, tourists still had regrets. This suggests that choice overload exists in the tourism industry.

When dealing with a lot of choices, some people are more spontaneous than others. Messner and Wänke (2011) found that spontaneous thinkers reported more regret and less satisfaction than unconscious thinkers although they seemed to be the least overtaxed by the decision difficulty as they reported the lowest frustration. The authors concluded that simplifying the decision by not thinking at all is not a solution.

3.4.2 Accounting

In certain industries, particularly accounting and finance, the diversity of information format may tremendously hinder the effectiveness of information processing and thereby cause information overload (Ho & Tang, 2001). Furthermore, Ho and Tang (2001) found that information quality is addressed as a primary source for information overload. This reflects the view of Eppler and Mengis (2003), who stated that information overload in the accounting and financial functional unit covers mostly the areas of the impact of the level of information overload on decision quality and accuracy.

In an earlier study, in the area of investment analysis, Tuttle and Burton (1999) reported that the presence of monetary incentives motivated increased response times which in turn resulted in higher levels of information usage than has been observed in previous studies. The information-processing capacity of an individual limits the amount of information that the individual can process. This means that too much information affects decision quality by producing less accurate and less consistent responses (Tuttle & Burton, 1999). This idea has been extended further by Farhoomand and Drury (2002) who reported that information overload may cause knowledge workers to fail to use the relevant information at hand or known to be available, leading to the inefficient use of decision-making time.

In the domain of finance where information typically comes from a large random array of sources and in incompatible formats, it is recognised that significant efforts are needed for information conversion (Ho & Tang, 2001). For example, people obtain information in a variety of formats, be that digital or printed, and online data are generated together with conventional printed books or magazines. Building on the problem of large quantities of information, most respondents in the study by de Bakker (2007) in an insurance organisation reported that information overload is related to extensively high volumes of information, because large volumes of information are associated with inefficient information processing.

There have been other studies on information overload in the field of accounting and finance. For instance, increased information experienced by capital budgeters negatively affects their performance; as the amount of information attending the capital investment task increases, capital budgeters are less systematic and exhaustive in their search

strategies through information sets (Swain & Haka, 2000). Information overload is also experienced in the banking industry in South Africa where the main cause of overload originates mostly from e-mail with respondents dedicating more than three hours daily to sift through huge amounts of relevant and irrelevant information (Burger & Rensleigh, 2007).

Information overload not only occurs at organisational level in the finance field, but also at an individual level. Agnew and Szykman (2005) expressed the view that when individuals review retirement annuity plans before purchasing, they can experience varying degrees of information overload depending on the amount of information available per plan and the number of different plans available. The authors revealed that people with a low level of financial knowledge suffer particularly from overload. Thus, information overload can be caused when making decisions in a field when the individual's knowledge and experience are inadequate.

3.4.3 Organisation science

The information environment from the early 21st century is unquestionably being offered a large variety of choices in terms of information and communication technologies to make decisions. Information overload has been associated with the two fundamental criteria of information management: the quantity and quality of information provided (Bawden & Robinson, 2008). According to Bawden and Robinson (2008), human civilisation has for most of history experienced issues and difficulties to find, or to provide, a sufficient quantity of quality of useful information.

Organisational design, such as the formal and informal work structure is an influencing factor affecting information overload (Eppler & Mengis, 2004b). de Bakker (2007) concurred with this view and added that to a large extent organisation design such as centralisation has created a need for more intensive communication and coordination, and this subsequently leads to greater overloads.

In an early study, O'Reilly (1980) found information overload to have a negative impact on organisational effectiveness and suggested that for organisations to be efficient, the information-processing capability of the organisation needs to match the information load

faced by the organisation. O'Reilly (1980) added that failure to achieve this balance may lead to the familiar problem of information overload and its less familiar obverse, information underload. Besides, since different organisation structures have different competences for processing information, organisations or functional units tend to be more efficient when the information-processing requirements of the task complement the information-processing capacity of the organisation/functional unit (Lane & Lubatkin, 1998).

The advancement of communication, especially e-mail and social media, has changed the way organisations conduct business and also the culture within the organisations. But these new means of communication have also introduced challenges. For instance, as proposed by Hemp (2009), most organisations unknowingly pay a high price as individuals struggle to manage the information glut as productive time is lost while employees deal with information of limited value. Also, a typical worker, who uses technology and information within the context of their job, spends more than 40% of their day processing work-related information (Denton & Richardson, 2012). The study by Anderson (2008) on the information-gathering behaviours of managers found that social media have become a central component and have a very strong benefit in terms of information and managers who utilise it.

According to Hauer and Butuza (2009), for organisational success, knowledge with the objective of adding value to the organisation, as a form of capital, must be exchangeable among persons, and it must be able to grow. This can be achieved by having an organisation structure that enhances knowledge and information flow. This contrasts with the view held by Denton and Richardson (2012) who stated that information overload and fatigue are due to the tendency to assume that information should be plentiful or shared. The authors suggested that it is a serious mistake to assume information should be shared as sharing information that makes data instantly available is more of a curse than a cure.

The study of Lu and Hung (2011) on the efficiency and effectiveness of 30 global e-retailing companies revealed that 43% of them needed to reduce their information inputs if they were to become efficient.

3.4.4 Information technology and information systems

In the field of information systems, there has been extensive literature on the subject of information overload in recent years. Management of information technology infrastructures in the modern enterprise is a challenge even for experienced IT professionals as they are faced with the daunting task of monitoring hundreds of thousands of interconnected elements, from individual hardware components and virtualised applications, to logical business services (Velez-Rojas *et al.*, 2011).

The new changing information environment, denoted Web 2.0, is another apparent cause of information overload (Bawden & Robinson, 2008; Tzagarakis *et al.*, 2012). Web 2.0 is a bi-directional collaboration in which users are able to interact with and provide information to central sites, and to see that information collated and made available to others (Goodchild, 2007). This is in contrast with the early Web which was primarily one-directional, allowing a large number of users to view the contents of a comparatively small number of sites. Web 2.0 generally encompasses a variety of sites and tools for shared information creation and updating, and social networking and communication such as blogs, file sharing, wikis, RSS feeds, podcasts and social networking sites. This variety, diversity, and abundance of fresh kinds of information and communication resources within Web 2.0 have undoubtedly contributed to information overload (Tzagarakis *et al.*, 2012).

There have been a number of studies on information overload caused by e-mail communication (Ruff, 2002; Schuff *et al.*, 2006; Laclavik & Maynard, 2009; Prasitratanaporn, 2010; Gallo, 2012). One of the often-complained-of time robbers is e-mail if not handled properly (LaBrosse, 2008). Sumecki, Chipulu and Ojiako (2011) suggested there is potential for an increase in the level of e-mail overload experienced by individuals within the organisation that does not have a clearly stated code of e-mail practice.

The escalation of internet-centred businesses has produced an unrelenting focus on e-commerce strategies, new business models and processes, which in turn require added competencies for effective management in this new business environment (Harris, De Long & Donnellon, 2001). One of the competencies that is required by the new manager, is to be able to stay focused on their strategic objectives and help their employees do the same

with the sheer volume of communications (Harris *et al.*, 2001). Swann (2006) interviewed IT managers in the banking sector and discovered that CIOs and IT managers are taking more non-IT responsibilities within the bank due to the fact there are more regulations that need to be followed and documented. In other words, there is more information that needs to be produced and processed. For example, due to the fraud, money laundering, ID theft and information security taking centre stage, banks are getting audited more often in more detail which has resulted in additional information obligations amongst the different parties.

3.4.5 Human resource management

Until recently, the traditional roles of the human resources departments in organisations have been to recruit, select, place and promote employees into different jobs, oversee salary and bonuses and perform administrative functions. With globalisation, and information technology, human resources departments are integrating human resources structures into the whole of organisational functioning (Bussler & Davis, 2001; Brock & Buckley, 2013).

There have been several studies on the topic of information overload in the field of human resource management. Bussler and Davis (2001) suggested that the introduction of the personal digital assistant (PDA), mobile phone, and interactive pager has brought more communication (all unified into a PDA, desktop or smartphone) to every businessperson. Unfortunately, even the most organised HR executives have trouble keeping track of the separate messages.

The increase in the number of communication mediums and volume of information have increased the pressure on managers to be available 24/7. When a team or group is overloaded it is less productive, more prone to errors, and too tired to innovate (LaBrosse, 2008). Increased demands on employees in high-pressure environments often lead to high rates of employee illness and turnover (Hallowell, 2005). Under these conditions, employees underachieve, create clutter, cut corners, make careless mistakes, and squander their brainpower. Studies on information processing and management have confirmed that there is a connection between effective information processing and

employee performance (Eppler & Mengis, 2004b). Some companies have recognised this implication of too much connectivity on employees and are offering meditation, yoga, and knitting classes to their employees during lunchtime to provide staff with a much-needed break to slow down and use their brains in a different way for an hour (LaBrosse, 2008).

Oldroyd and Morris (2012) believe that information flow can be aggravated by high calibre employees who they call “star” employees. Stars are likely to accumulate an abundance of connections leading to needed information flows due to their high visibility and performance position. Therefore, due to the increase in needed information flow, star employees are more susceptible to be affected by information overload than their average performing colleagues (Oldroyd & Morris, 2012).

Bussler and Davis (2001) argued that in the future smart systems or artificial intelligence will assist HR managers manage information overload. These systems will analyse trends in information flow, and make recommendations or adjust incoming information automatically.

3.4.6 Multi-functional units and interdisciplinary research

As discussed, the phenomenon of information can occur in multiple functional areas and management disciplines. From an organisational view, information overload has been explored amid decision makers and individuals, in addition to certain business functional areas. Some of the studies have examined information overload in more than one functional area. For instance, Eppler and Mengis (2003) reviewed literature for the past 30 years on the main definitions, situations, causes, effects and countermeasures of information overload in the disciplines of accounting, management of information systems, organisational science, and marketing. Butcher (1995) classified management research on information overload into three broad categories: personal information overload problems, organisational information overload and customer information overload. Klausegger *et al.* (2007) surveyed company executives from five developed countries to examine the nature and negative effects of the information overload phenomenon across multiple disciplines. They concluded that most contributions to

research on information overload have been notably in the disciplines of psychology, marketing, and organisational theory.

There have also been multiple studies on information overload in the healthcare sector (Ho & Tang, 2001; Klerings, Weinhandl & Thaler, 2015). Ho and Tang (2001) argued that the information coming from research in the healthcare sector also recognised information overload as the major problem in the financial industry.

Figure 3.6: Information overload studies across functional areas
Source: Adapted from Eppler and Mengis (2004b)

Figure 3.6 shows the different research areas of information. What is important to notice is the overlapping of the research of the different areas. For example, Schick et al. (1990) defined information overload by drawing on literature on information overload in the field of organisation theory and information systems. Tzagarakis et al. (2012) proposed an innovative approach that aims to facilitate collaboration and decision making in data intensive environments by incorporating human resources and information systems.

(Jackson & Farzaneh, 2012) developed a conceptual model to classify the factors of information overload by compiling a comprehensive list of factors from studies in psychology, computer science, information system management, marketing, organisational studies and accounting, as well as library and information science.

The benefit of the interdisciplinary approach is that it can provide a more complete understanding of information overload that can be useful in tackling the problem (Eppler & Mengis, 2004b).

Having identified the functional areas and management disciplines that have been affected by information overload, the next section examines the effects that this problem of information overload can have on individuals and organisations.

3.5 THE IMPACT OF INFORMATION OVERLOAD

Hu and Chen (2011) found that information overload on employees firstly impaired the quality of work they produced and secondly it led to mental- and psychological-related issues. There has been constant improvement in the field of information technology and communication, which has resulted in more storage and faster retrieval of information. However, the human capability to process information has not increased as much as technology. This was reported by Shenk (1998) who stated that information overload reduces attention span, upsets family life, affects our reasoning, takes over our personal time and causes stress. The fact that humans have limits on the amount of information they can process and have clear limits with which the brain can process items in working memory has a net result on increasing stress on individuals (Heylighen, 2002).

3.5.1 Effect on quality of work

One of the effects of information overload is the difficulty to make decisions due to the time spent searching, sorting and processing information (Farhoomand & Drury, 2002). As previously stated, information overload can lead to poorer decision making as decisions are sometimes reached by thinking over crucial information (Krinn, 2011). For instance, there

is a decrease in accurate decisions when investors (Bloch, 2011) and venture capitalists (Zacharakis & Shepherd, 2001) are faced with information overload.

The Internet has allowed the broadcast of information within seconds to millions of people. The consequence of this ease of communication is a flood of irrelevant, vague, unclear and inaccurate data fragments (Heylighen, 2002). Besides, due to the accumulated number of these inaccurate, over and understatement fragments of information, confusion, misunderstanding and misinterpretation can occur as a result of too many choices or mixing up all this information (Sparrow, 1999; Heylighen, 2002; Park & Jang, 2012).

Overload distracts and disrupts individuals by diverting their attention from their main tasks as they do not always focus on the most relevant information but might become distracted by less relevant information (Nisbett, Zukier & Lemley, 1981; Wilson, 2001; Watts *et al.*, 2009; Strother & Fazal, 2011). For instance, to prevent information overload, people sometimes avoid certain important information related to their main tasks (Strother, Ulijn & Fazal, 2012).

Information overload is costly to companies. For example, Waddington (1996) reported that 38% of managers wasted "substantial" amounts of time just looking for information. An organisation employing 1000 knowledge workers wastes US $5.7 million annually just on the time wasted by employees having to merge and reformat information from multiple sources and in multiple formats (e.g. Microsoft Office, OpenOffice, PDF, etc.) (Feldman, Duhl, Marobella & Crawford, 2005). In a more recent article, Sanchez (2008) stated that interruptions and distractions cost organisations 28% of an average workday equating to US$900 billion annually.

Information overload is not only a distraction from issues that ought to be focused on, but also causes anxiety, confusion, and a sense of being overwhelmed (Himma, 2007).

3.5.2 Psychological effect

Information overload negatively affects staff productivity, quality of decision making and levels of stress (Waddington, 1996). Besides stress, information overload can be a major source of confusion (Hijazi, 2004). In addition, Lee and Lee (2004) study on online

purchasing found that information overload results in less satisfied, less confident, and more confused consumers. Hemp (2009) suggested that the stress of not being able to process information as fast as it arrives, combined with the personal and social expectation that, say, you will answer every e-mail message, can trigger exhaustion and demoralisation.

Information overload can occur at personal and interpersonal levels but the collective consequence can severely harm organisational performance (Sacks *et al.*, 1997). Moreover, there is a negative relationship between information overload and the fulfilment of job responsibilities, with information overload being perceived to be the most stressful (Klausegger *et al.*, 2007; Yuanliang *et al.*, 2011). Information overload is associated with stress as it contributes to tension between colleagues and loss of job satisfaction (Waddington, 1996). Furthermore, heavy information overload negatively affects the performance of an individual in terms of speed and accuracy.

Li and Li (2011) stated that as people find it ever more difficult to cope with the increased amounts of information they receive, with increasingly unpredictable side-effects of their actions, the more negative the effects are on their physical and mental well-being. The discussion thus far has highlighted the causes, the functional areas and management disciplines, and impacts of information overload; however, it is important to also consider how organisations and individuals can manage or curb information overload in this age of information superabundance.

3.6 MANAGING INFORMATION OVERLOAD

There are multiple solutions to information overload similar to the multiple causes, and there is no single method that will fix the problem (Bawden *et al.*, 1999). Previous studies on information overload do not only review major causes and effects, but likewise recommend possible effective countermeasures to tackle the problems associated with information overload. Of the many tools and techniques available to manage information overload, no single tool or technique will correct the problem on its own; a multipronged approach is required for curbing this multi-faceted problem (Bawden, 2001; Hemp, 2009).

Bawden *et al.* (1999) classified the solutions for curbing information overload into two broad categories, managerial and technical. They found that since “loss of control” was the

chief symptom of information overload amongst managers and employees, restoring control at both organisation and individual level is a major step towards its remedy. This was supported by several other authors, who also suggested that technical approaches, management strategies and social behaviours within inter-personal networks can undoubtedly aid in making sense of information overload (Rochat, 2002; Whelan & Teigland, 2010). In addition to the adoption of personal information management strategies and integration of technologies, Edmunds and Morris (2000) also talked about filtering information via information specialists/officers.

Eppler and Mengis (2004a) synthesised the literature and grouped the major possible information overload countermeasures within five constructs. These constructs are: personal factor information, information characteristics, tasks and processes, organisational design and information technology. They summarised business-related literature in a conceptual framework with these five constructs that can be used to assess the extent of overload and the effectiveness of countermeasures.

Hemp (2009) suggested that since information overload affects individuals and companies, the solution must tackle the cause of overload for both individuals and companies. He proposed technology as an aid to alleviate the problem for both individuals and companies. Furthermore, it is up to the individual to take control of the information problem by modifying their thinking and behaviour. Tackling information overload at the organisation level entails not only technology but also a change in the collective behaviour of the individuals (Hemp, 2009).

The following collections of suggestions as outlined in the literature are proposed countermeasures to this ever-growing problem of information overload.

3.6.1 The person

As described in the earlier sections, personal factors are one of the major reasons why organisations or individuals are faced with information overload. The level of information overload an individual faces is subjective and depends on the individual's personality traits such as imagination, reserve, complexity, and emotionality (Milord & Perry, 1977). Different people may show different perceptions of information overload when faced with

the same amount and type of information (Prasitratanaporn, 2010). Jackson and Farzaneh (2012) indicated that people with less experience and motivation tend to be affected more by information overload.

One of the remedies for information overload proposed by Bawden and Robinson (2008) is for an individual to take control of their information environment by using methods such as those listed in Figure 3.7.

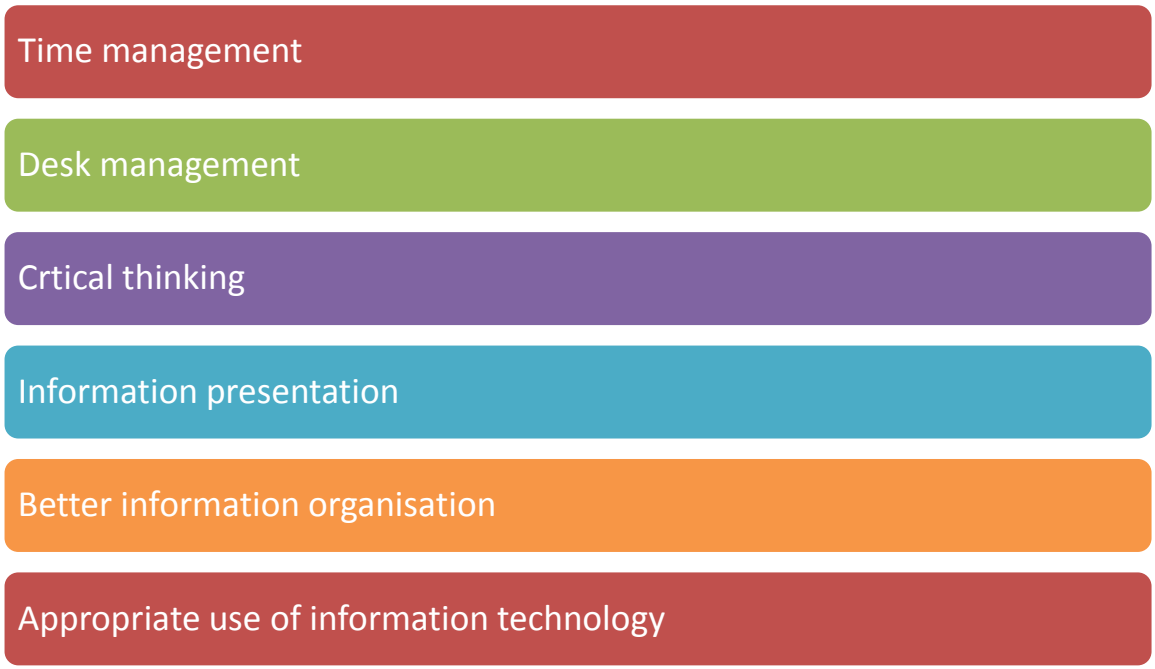

Figure 3.7: Remedies for information overload

Effective time management can help managers reduce information overload by filtering information through priorities and selecting required information for completing their tasks (Haksever & Fisher, 1996). Another important aspect that helps information flow in the organisation is an effective filing system which can result in better time management and alleviating information overload (Haksever & Fisher, 1996).

From the information technology perspective, several authors advocate employing intelligent information management systems for fostering easier prioritisation of information (Eppler & Mengis, 2004b; Bawden & Robinson, 2008; Hemp, 2009). Hall and Walton (2004) stressed that the efficient use of information depends not just on

technology, but also on a correct organisational structure to take advantage of that information.

Bawden *et al.* (1999) stated that the skills required by the individual are neither complex nor technical and most of them can be classified under the heading of 'time management'. Correspondingly, there is the need for top managers to focus on the jobs at hand as information overload floods leaders with diverse queries that often could be addressed by others, thereby distracting those leaders from high-stake problems where they are most needed (Dean & Webb, 2011). Keeping focus on the jobs was supported by Denton and Richardson (2012) who suggested that the first step in making better decisions and gaining control of information overload is to keep focused on key organisational objectives. For example, be careful not to be too light on deserving topics and make the time to get to meaningful depth on the most important ones (Dean & Webb, 2011). Ask the questions, "What do you want to do?" and "Is this data useful for that purpose?" (Denton & Richardson, 2012).

Delegating work, especially for screening and filtering information, is another popular means that individuals use to control information overload (Farhoomand & Drury, 2002). A good filtering strategy for a leader starts with keeping pertinent information that is critical to the company's performance, either in the present or in the future (Dean & Webb, 2011). To manage information overload, it is essential for a user to discriminate among useful, redundant, incorrect, and meaningless information in order to organise potentially relevant information (Bergamaschi *et al.*, 2010; Hiltz & Plotnick, 2013).

Since the filter of relevant information from the exploding quantity of information has been left largely to the users, these users need to be trained in digital literacy in order to assume this role (Koltay, 2011). Information literacy education emphasises, among other factors, critical thinking and the necessity to recognise message quality. However, information literacy is not a solution to information overload until such time that it can be proved that information literacy does not only comprise training programmes benefiting information specialists and academic librarians but that these programmes could benefit anyone else (Bawden & Robinson, 2008; Klerings *et al.*, 2015).

Several researchers have described the people's factor solution for information overload. For example, Ruff (2002) divided the people solution into the categories of reactive and proactive. Proactive strategies attempt to prevent information overload such as information literacy training, time management training, technology training and personal information management (Schick *et al.*, 1990; Ruff, 2002; Whittaker, Bellotti & Gwizdka, 2006; Bawden & Robinson, 2008). Reactive strategies are implemented once information overload has occurred. Filtering information to focus attention on the most useful, prioritising and approaching the most important tasks and multitasking two or more job functions at the same time are examples of reactive strategies (Grisé & Gallupe, 1999; Kock, 2000; Eppler & Mengis, 2004b). Farhoomand and Drury (2002) added prioritising information and work tasks and elimination of redundant information as means of curbing overload.

Finally, to truly make all the stated recommendations work, leaders should redesign working standards together with their teams. One person, even a CEO, cannot do that alone; it must be a collective approach among the teams and organisations (Dean & Webb, 2011). The next section describes the solutions that can be implemented at the organisational level to minimise information overload.

3.6.2 The organisation

Information overload is dependent on not just the flow of information and ideas, but on the operating processes and tasks. For example, information overload can be caused by simultaneous input of information into the process (Grisé & Gallupe, 1999). Grisé and Gallupe (1999) stated further that it is essential to identify processes that can curtail overload and enhance integration of information. Edmunds and Morris (2000); Bawden (2001); Eppler and Mengis (2004b) supported this by suggesting that one of the countermeasures to information overload caused by organisational processes is to standardise operating processes which should be done with the process team and information specialist. Furthermore, information overload may also arise during group meeting. Grisé and Gallupe (1999) claimed that there is a need to identify and better understand those group processes that can minimise overload and enable better integration of information during these group meetings. This can be accomplished by using

a human facilitator who can control the number of ideas to be organised by removing redundant concepts, or grouping similar ideas prior to presenting the ideas to the group.

One obvious solution to the problem of information overload in businesses, according to Edmunds and Morris (2000), would be to employ specialists in information handling to carry out the acquisition of relevant information processing and packaging the information needed as appropriate. Likewise, Rochat (2002) stated that to cope with information overload is to consider the employment of information specialists to organise and filter organisational information to reduce the number of irrelevant information or who can assist with in-house training on search techniques. Yet, according to some CEOs, because of current new access methods to information supported by communication software, the services of the information specialist is no longer required (Citroen, 2011). He added that today it is the interpretation of data and ensuring the relevance of information for the executives which is the bottleneck, not the process of searching.

With the diverse types, varying quality and multiple sources of information, enterprises must design efficient processes to capitalise on employees' skills and experiences. On the other hand, recent studies show that the adopted style of decision-making process can have a positive or negative effect on the level of information overload in the organisation (Bettis-Outland, 2012). For example, a study by Eisenhardt and Bourgeois III (1988) argued that fast decision makers utilise more information and develop more alternatives, in comparison to slow decision makers. Accordingly, the processes defined within an organisation can result in either an increase or a decrease in information overload.

Eppler and Mengis (2004b) reported that a critical issue that affects the incidence of information overload is the organisational design of the company. For instance, with globalisation and centralisation there is a need for more intensive communication and coordination which necessitates more information-processing requirements which in turn can introduce information overload (Bawden, 2001; MacDonald *et al.*, 2011). In an organisational context, as described by Prasitratanaporn (2010), information overload occurs frequently in centralised organisations as information systems and business processes become more integrated. Conversely, improving organisational design with better standards, common procedures and rules can decrease the information-processing

requirements and therefore reduce information overload (Schick *et al.*, 1990). Moreover, Zhuang *et al.* (2011) reported that the occurrence of information overload in an organisation is an indication that the organisation is failing to adequately utilise corporate resources to filter relevant information.

The quality of decisions made by an individual associates positively with the quantity of information obtained up to a threshold point or tipping point, and that beyond that threshold, information quantity becomes detrimental to decision making (Schick *et al.*, 1990; Fukukura, Ferguson & Fujita, 2013). This threshold point will determine how much information would be included in decision making and it will also define the information flow depending on the structure of the organisation (Zhuang *et al.*, 2011; Jackson & Farzaneh, 2012).

E-mail interruption is one of the reasons for information overload, as previously discussed. Therefore, reducing these interruptions could reduce the time lost to the interruptions. Jackson *et al.* (2003) recommended informing staff of the number and nature of interruptions and the detrimental effect it has on the organisation. They also proposed training staff in the effective use of communication technologies, especially e-mail, to reduce the interrupt effect on employee time and, as a result, increase employee effectiveness.

Parallel to the individual level, organisations also need to establish organisational standards for electronic communication, either explicit or implicit. If a norm is implicit, leaders, senior executives and managers should set the example (Hemp, 2009). For example, they need to develop guidelines that specify the preferred communication channels for diverse types of information. E-mail communication could be reduced by using the company's intranet or use of pull instead of push strategy. Information flow is the foundation of any organisation and how this information is organised and managed will determine the information overload level within the organisation (Zhuang *et al.*, 2011).

Due to the multidimensional facets of the problem of information overload, the problem needs to be on senior management's agenda. Salim (2003) stated that it is essential to develop an information strategy for the organisation which considers the problems of information overload. The problem of information overload could be minimised by

developing effective information architecture to provide a framework for the information strategy of an organisation (Jain, 2014). One such strategy is using technology such as information management tools to counter information overload (de la Rouviere & Ehlers, 2013; Yang & Albers, 2013; van Knippenberg, Dahlander, Haas & George, 2015).

3.6.3 Technology

As discussed in the previous section, technology, indisputably, is one of the reasons for information overload. At the same time, organisations are currently facing an especially difficult challenge in finding ways to use technology to deal with information overload (Farhoomand & Drury, 2002).

Information overload can be reduced by making use of information technology for filtering and prioritising information (Baez *et al.*, 2010; Schornac & Beck, 2011). Filtering, prioritising, and searching processes support users in detecting the messages that satisfy personalised criteria from the ones received (Bergamaschi *et al.*, 2010). With prioritised and filtered information, the individual will know which information to address first and will only receive valuable information (Oldroyd & Morris, 2012). As a result, prioritising and using filters may influence the information load for the individuals and collectively the organisation as well. This means that with a decreased information load for each individual in the organisation, the collective information load for the organisation will also decrease (Bergamaschi *et al.*, 2010; Klerings *et al.*, 2015).

Filtering helps controlling information overload by sifting interesting knowledge through the vast amounts of available information (Raoufi, 2003). According to Detsis *et al.* (2001), a beneficial filter should remove irrelevant information when identified but at the same time it has to preserve sufficient information to make decisions. Wang et al. (2012a) stated that by using standard procedures, users can take some methods of information filtering to block the information they do not want and retrieve the information they want. This can help in keeping quality information and discarding false information such as spam, phishing, commercial advertising, insulting, internet attacks and other internet problems. Moreover, organisations are now starting to use highly advanced search engines to search the full text of all files stored within their systems (Jackson & Smith, 2011). In the context

of information overload, technological filters are designed to assist in winnowing out the least applicable information to fit their work requirements more precisely (Alexander, Holland, Orlowitz, Tsao, Ogburn, Keane, Barrett, Thomas, Herron & Cumming, 2016).

Ireland (1999) argued that locating the information people need to do their job now becomes the key issue. For instance, 10% of employee time is used for finding suitable information for completing their jobs (Dubie, 2006). One of the most significant strategies for addressing information overload is determining relevance measures for selecting or retrieving information that best matches user requests (Bergamaschi *et al.*, 2010). Therefore, there is a requirement for more advanced search engines to retrieve the best informational resources (Baez *et al.*, 2010; Jackson & Smith, 2011). This technology is often referred to as intelligent agents.

An intelligent agent is a computer program that can be thought to act as a personal assistant and employs artificial intelligence techniques to provide active assistance to a user (Maes, 1994). Intelligent agents scan and summarise text and automatically route the information for users and are seen as smarter than average search tools (Salim, 2003). Several authors advocate the use of intelligent agents as a means to control overload (Maes, 1994; Bawden *et al.*, 1999; Edmunds & Morris, 2000; Hu & Chen, 2011). But intelligent agents are not infallible (Waddington, 1996). The downside with intelligent agents suggests the risk of omitting novel and possibly noteworthy information or overwhelming the user with duplicate information that is already known by the user (Dowling, 2000). The author also mentioned its ethical aspects with privacy and security regarding user information (preferences) and financial cost to the company.

Recent literature discussed data mining (Ananiadou, Kell & Tsujii, 2006; Rupnik, Kukar & Krisper, 2007) and data warehousing (Park, 2006) as methods of improving quality of information when organisations are presented with huge amounts of information. Data mining is a process for analysing raw data by extracting and analysing raw data to find required and useful patterns and presenting the results in concise and useful forms (Fayyad, Piatetsky-Shapiro & Smyth, 1996; Kargupta, Hamzaoglu & Stafford, 1997). Data warehousing involves extracting data from source systems (e.g. legacy, external), improving the quality (e.g. by eliminating inconsistencies), transforming the data (e.g.

applying business rules, summarising), and then loading it to a data store (e.g. relational database) (Watson, Goodhue & Wixom, 2002). For example, data warehousing is sometimes used for data prioritisation as it allows for investigation of diverse data types which necessitates a flexible, uniform and simplified interface to query, retrieve and analyse data across diverse sources (Chen, Tripathi & Mizuguchi, 2011).

Furthermore, Edmunds and Morris (2000) proposed using push and pull technologies in addition to intelligent agents as a means to control overload. Information push and pull technologies have contradicting reviews in the literature. For example, Cone (2009) found that pushing information to the users may cause overload depending on how much information is pushed. Anyway, some of the information received might still be irrelevant (Shenk, 1998). In general, push works best when it's used for information that must be accessed and acted on immediately (Allen & Wilson, 2003). On the other hand, with pull technologies, the volume of information available for searching and retrieving at the user's discretion may be so large as to be daunting (Bawden & Robinson, 2008). Basically what is required is to match users' needs and available data (Bergamaschi *et al.*, 2010).

The following are other strategies that focus on the use of technology to curb information overload:

- Spend more time and money improving user ability to operate technology fully and successfully (as opposed to buying more and better technology) (Ruff, 2002).
- Use list or group strategies, especially on social media websites, to constrain varied communication activity into separate feeds where the context is more easily understood (such as creating a list of musicians) (de la Rouviere & Ehlers, 2013).
- Use intranets and supporting software which have the capability to delete irrelevant content and add important context information (Denton & Richardson, 2012).
- Use data federation, or data virtualisation, whereby a leader grabs snippets of information from different systems for quick access and analysis. Data virtualisation enables users to quickly access data that is pertinent to their particular requirements (Sherlock, 2011). But the author added that this technology is aimed at small quantities of data that do not require significant manipulation.

- Use business intelligence tools that flag exceptions to usual workflow (Cone, 2009). For example, business intelligence tools can analyse the customers' behaviour through data mining and knowledge discovery, which helps in sales increasing (Yu & Ji, 2010). Business intelligence is broadly defined as an analytical process which transforms fragmented data of organisations into information or knowledge about objectives, opportunities and positions of the organisation (Wieder, Chamoni & Ossimitz, 2012).

Dealing with information overload is not a technical problem alone. Although information technology will play a vital part in new information handling processes, unless we organise our environment, data, the way we disseminate information and improve competence of the individual in information processing, technology will be of little help (Edmunds & Morris, 2000; Hijazi, 2004). For instance, information quality problems, such as incorrect information can be due to computer program errors (Gorla, Somers & Wong, 2010). The authors added that with increased organisational dependence on information technologies and information systems, losses resulting from poor IT quality can be considerate.

Information as a solution to information overload are considered in the last section on the methods to manage information overload.

3.6.4 The information

The general-purpose information in a workplace is to inform, persuade and make the correct decision, and therefore the quality and kind of information are relevant and important. The importance of information quality for organisations was described in Section 2.7.4. Owen (1992) stressed that due to increasing workload, more emphasis should be placed on the quality of information and not on the quantity of information. Sparrow (1999) emphasised that for individuals to process information properly, the information must be of high quality with rich and sophisticated linkage. A piece of clearly presented information from a trusted source relevant to the task at hand is less likely to cause overload than a piece of ambiguous information from a dubious source (Zhuang *et al.*, 2011).

Bloch (2011) explained that for decision makers to make the right decisions, they need to be informed sufficiently (but no more) and at the same time the information must be simple to understand. Sherlock (2011) stated that more time needs to be devoted to resolving issues around data definitions and improving data quality because having good and consistent data from the outset will allow companies to produce better quality reports and analysis.

Eppler and Mengis (2004b) identified that these various characteristics or qualities of information such as novelty, ambiguity, uncertainty, intensity and complexity can amplify or reduce information overload. The effects of information overload can be diminished if measures are enforced to ensure that information is of high value (Edmunds & Morris, 2000; Bawden, 2001), represented correctly and properly documented (Herbig & Kramer, 1994). An improvement in information quality can be also be achieved by aligning IT strategy with business strategy (Gorla *et al.*, 2010). Therefore, refining the quality of information can help an individual to process information more efficiently.

Ruff (2002) and Eppler and Mengis (2004b) listed various information attributes as possible help in limiting information overload:

- Use charts, graphs and other graphical representations that allow data to be viewed and assessed more quickly and thus minimising intensity.
- Try to avoid irrelevance by stating intended audience and purpose in the first paragraph.
- Summarise content in the beginning of the communication (e.g. use executive summaries).
- Avoid complexities by writing clear, short and succinct memos and e-mail.
- Use the phone for complex subjects that would require multiple e-mails.
- Use e-mail if multiple phone calls are required or multiple recipients are involved in the task.

Each of these factors must be contemplated for managing information overload. It must be noted that normally one or a combination of these factors may be responsible for information overload (Eppler & Mengis, 2004b).

The next section lists researches on the topic of information overload across the many different industries.

3.7 INFORMATION OVERLOAD IN INDUSTRIES

Regardless of the fact that research in information overload has been mostly in the academic, business and commercial industries as well as in professional industries such as science and healthcare, it cannot be denied that it has been a matter of concern in other industries. Examples of some of the areas explored by information overload studies were presented in Table 1.1.

Despite the remarkable expansion in the information overload research as shown by the extensive body of research on the topic, there has been very little published research in the area of shipping. So far, this literature review has identified information overload in terms of it causes, effect and potential solutions. The summary of this chapter concludes this literature review by stating the gap identified.

3.8 SUMMARY OF CHAPTER THREE

Chapter Three has reported on the state of the research regarding information challenges and information overload and data quality in terms of organisations and individuals. The review led to numerous contributions which address information overload in multiple disciplines and industries from the individual and organisational view. The increasing interest in information overload has resulted in several articles on the subject. Relatively well explored, for example, is the impact of technologies such as e-mail and internet on quality of work and psychological-related issues. Nonetheless, there is a lack of research into the topic in the shipping industry literature and more specifically the South African context, which only accentuates the need to investigate information overload as a serious research problem.

Furthermore, very few studies explore information overload on the antecedents of information management technologies such as big data, data warehouse and data mining. Apart from that, new research directions emerge as organisations are increasingly influenced by modern technologies such as bring 'your own device', which permits employees to bring personally owned mobile devices such as laptops, tablets, smart phones and wearable devices (e.g. Google glass and smart watch) to their workplace.

There has not been a consensus on the definition of information overload from previous researches. Information overload has been defined using multiple different terms and from different perspectives, such as information load, processing capacity, information pollution, overabundance of irrelevant information, quality and quantity of information, etc. These contribute to the difficulty of comparing and generalising research results.

While promising solutions have been identified in the literature, the fact that information overload is still prevalent suggests opportunities exist to discover solutions that would assist affected individuals and organisations. Moreover, although a growing body of empirical research has addressed information overload in organisations, there is an absence of possible best practices in the literature on how to effectively manage information overload in organisations.

Motivated by the gap in the literature regarding information overload in the shipping industry on the one hand and the importance of the topic in the South African context, this study has aimed to fill this gap in the information overload literature by developing research propositions that consider different perspectives defined by Western, European and Asian studies on information overload, and adapting them to the shipping industry in the South African context. In addition, this gap in the literature points to a need for the development of a set of best practices to manage information overload. To address this gap in the literature, the ensuing chapter delves into issues regarding the methodology that was used for this study.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 INTRODUCTION

The preceding chapters examined the existing literature on the subject of information overload. Chapter Two created the content of the study by discussing the role of business, the need for technology and the need for information. It became abundantly clear in Chapter Three that whilst information is necessary to enable strategic advantage, too much information is not only harmful to the organisations, but to their employees as well. Chapter Three also demonstrated that studies have been conducted on information overload in various countries and various industries. What has not been explored at length is the occurrence and management of information overload in South African companies.

The South African shipping industry is an information rich sector and anecdotally it has been stated that employees are suffering from information overload. This study is intended to establish the existence of information overload in the shipping industry and how, if it is, being managed.

This chapter is a description of the procedures followed in carrying out the empirical study. It discusses the research problem, the objectives, sampling, research approach, research tools and the research instrument used for obtaining information about the impact of information overload on employers and employees in the South African shipping organisations.

4.2 PROCESS FOLLOWED

A research design provides a framework for the collection and analysis of data (Bryman & Bell, 2007). The research design for this study is illustrated in Figure 4.1.

Figure 4.1: Research methodology

Figure 4.1 helps to overview the research design in a concise format in terms of the steps that were followed. The first step of the study was to define the problem statement which made it possible to outline the negative points of the current situation and explain why it matters. Based on the problem statement, the research question was formulated that guided the study and assisted in the construction of a logical argument. This was followed by determining the aim of the study whereby the overall purpose of the study could be clearly and concisely defined. The definition of the objectives followed. The objectives of a study are subsidiary to the aim and emphasise how aim is to be accomplished. The approach section in this chapter introduces the overall methodological approach used for investigating the research problem and the reason for the chosen method. The location, population and sample sections of the chapter provide a justification for subject selection

and sampling procedure that was used to draw a sample for this study. The rest of the chapter addresses the methodological issues associated with the choices of data collection, instruments and data analysis. Basically, the methodology section describes the specific methods of data collection that were used to conduct the research and answer how the collected data was analysed.

4.3 PROBLEM STATEMENT

A problem statement indicates the specific purpose of the research, the variables of interest to the researcher, and any specific relationship between those variables and also includes a description of the background and rationale for the study (Fraenkel, Wallen & Hyun, 1993). A research problem statement does not state how to do something, offer a vague or broad proposition, or present a value question (Bryman, 2007). It is an explanation of the existing issues which require in-depth study and analysis, so as to understand and solve them (Saunders, Lewis & Thornhill, 2016).

4.3.1 Background

Due to the advancement of technology and globalisation, there has been an accelerated production of information through business, media, education and science (Kock *et al.*, 2008; Velez, 2008). Internet-based media, such as e-mail, blogs, instant messaging, social networks and tweets have facilitated information distribution and knowledge acquisition (Hu & Chen, 2011). Both the volume of information available to decision makers and employees and the volume of information that they handle throughout the course of their day-to-day work are substantial. Furthermore, not all these information sources are of equal importance to information consumers. Consequently, managers have to sift through this huge amount of information, select the most relevant information sources, summarise and combine the results, before getting to the required information. Too much information can result in poor decision making as there is a need for more resources, especially time to process it (Zhuang *et al.*, 2011). Adoption of new information sources and retrieval is a response to an environment where information overload and information stress are

increasing (Woodhead *et al.*, 2001). In short, information overload occurs when the amount of information received is greater than what can be processed.

The shipping industry have not been spared by information overload. There has been a dramatic increase in the accessibility of satellite derived data of the oceans and the use of more sophisticated weather models to provide near real-time information on weather, sea surface winds, altimeter data, sea surface temperatures and inputs from real-time tide gauges (Gilbert, 1999). An early study of Gilbert (1998) reported that for effective incident response times there is a requirement for rapid access to the vast array of meteorological and oceanographic data and sophisticated computer modelling information. Gilbert (1999) added that the observation of the weather and sea conditions and the rapid transmission of information are vital for the safe operation of vessels throughout the world, for the safety of mariners, and for the protection of the marine environment from oil pollution. Furthermore, there is already a massive flow of information exchanged between the vessels and the offices on land across the multiple ports and countries (Houtman *et al.*, 2005). Mills (2006) mentioned that information overload occurs because of various information sources such as radar, telephone, fax, computer screens and intercoms – these varied sources have sometimes been blamed for accidents and collisions of shipping vessels.

In addition, hyper competition and the volatile business environment that results from globalisation and technological development have affected shipping companies in terms of the quantity and quality of information they manage.

4.3.2 Research problem

The extent to which information workers are experiencing information overload in South Africa is not covered in academic literature. Furthermore, there is even less known about the impact of information overload on management decision-making in shipping organisations. The review of the literature has provided insight into the problem, causes of and solutions to information overload. However, the solutions provided do not embrace the complexity of the problem (Eppler & Mengis, 2003). Therefore, it is crucial to assess different approaches to dealing with this information challenge in a manner that will lower

the information load on employees and decision-makers and help them in their day-to-day work and decision-making processes.

4.4 RESEARCH QUESTION

The question that arose from the literature review was: Does information overload exist in the South African shipping companies? If it exists, then is it being managed?

To address this central research question, the following sub-questions were formulated:

- Are employees overloaded with information?
- What are the effects of information overload on an employees' wellbeing, morale, stress and motivation?
- Are management aware that employees are suffering from information overload?
- Is information overload being managed by the leadership of shipping companies?
- What methods are management using to manage information overload?
- What international best practices are available to shipping companies to manage information overload?

4.5 AIM

The aim of this study was to establish whether information overload exists in South African shipping companies and if it is being formally managed. To achieve this aim, various objectives were formulated.

4.6 OBJECTIVES AND NEED FOR THE STUDY

Consistent with the aim, eight objectives were identified: four are quantitative objectives and four are qualitative objectives.

4.6.1 Quantitative objectives

The quantitative objectives needed to achieve the following:

- Determine whether employees are aware of information overload.
- Identify what the sources of information overload are.
- Assess the effect of information overload on employees.
- Compare the level of information overload amongst companies in the shipping industry.

4.6.2 Qualitative objectives

The qualitative objectives needed to achieve the following:

- Establish management's awareness of information overload.
- Evaluate how companies are managing information overload.
- Determine the impact of information overload on companies.
- Establish guidelines for good practice for managing information overload.

In view of the preceding statement of the research problem, aim and objectives statements, the method envisaged to research the problem of the impact of information overload can now be discussed. The first step is to discuss the research approach.

4.7 APPROACH TO STUDY

The first phase of the approach to answer the research question was to review existing literature. The literature review forms the basis for the empirical study to determine the awareness of stakeholders in the South African shipping organisations in respect of the impact of information overload.

The review of Eppler and Mengis (2004b) on studies from 1974 to 2004, shows that information overload has mainly been studied via experiments, surveys and qualitative

interviews. In another review, Eppler and Mengis (2009) found that between 1999 and 2009, there were more quantitative corporate surveys related to information overload in organisations than qualitative surveys.

The distinction between quantitative and qualitative studies relies on the type of information being sought. Quantitative studies rely on quantifiable information such as numbers and figures while qualitative studies are on qualifiable information such as words, sentences and narratives (Blumberg, Cooper & Schindler, 2011). Qualitative approaches are concerned with interpretation and understanding, whereas quantitative approaches deal with explanation, testing of hypotheses, and statistical analysis (Eriksson & Kovalainen, 2008).

This study used a mixed method design that combines procedures for collecting and analysing both quantitative and qualitative data in the context of a single study. Mixed methods research is an approach that combines quantitative and qualitative research approaches in the same research inquiry. Such work can help develop rich insights into various phenomena of interest that cannot be fully understood using only a quantitative or only a qualitative method (Venkatesh, Brown & Bala, 2013).

There are several data collection methods available which are an integral part of research design (Sekaran, 2009). These collection techniques, instruments and sources can be used to answer the research questions and can be broadly classified as use for quantitative and qualitative research (Creswell, Ebersohn, Eloff, Ferreira, Ivankova, Jansen, Nieuwenhuis, Pietersen & Plano Clark, 2016).

Table 4.1 shows some of data collection methods categorised under the two research approaches specified.

Table 4.1: Comparison of data collection methods

Quantitative data collection	Qualitative data collection
Surveys via questionnaires – Paper-pencil questionnaires and web-based questionnaires.	In-depth interviews, guided and structured interviews – Face-to-face, telephone, computer-assisted.
Tracking – Research marketers monitor the behaviour of consumers as they engage in regular purchase or information-gathering activities.	Textual data – Document analysis, company records, journal records.
Experiments and clinical trials – Researchers undertake experiments to gauge how the manipulation of one variable affects another. Experiments are used in areas like product testing, advertising design and setting price.	Visual materials – Pictures, videos, paintings.
Structured interviews – Researcher asks a standard set of questions and nothing more.	Case study research – Provides tools for researchers to study complex phenomena within their contexts. IT focuses on gaining an in-depth understanding of a particular entity or event at a specific time.
Structured observation – Who is observed, when and where they are observed, what is observed, and how the observations are recorded to provide a quantitative observation.	Making observations – Listening, reading, smelling and watching.
Obtaining data from management information systems.	

Source: Kawulich (2005), Hair, Money, Samouel and Page (2007), Eriksson and Kovalainen (2008), Sekaran (2009), Leedy and Ormrod (2010), Blumberg *et al.* (2011) and Creswell *et al.* (2016)

It is obvious from Table 4.1 that there are multiple data collection methods available for both quantitative and qualitative studies.

4.7.1 Quantitative research

The quantitative research method is about using numbers to help define, describe and resolve a wide range of problems (Curwin & Slater, 2007). For example, Hall *et al.* (2007) used questionnaires to show that more information can decrease accuracy and simultaneously increase confidence. Likewise, Klausegger *et al.* (2007) analysed data from a five-country published study of information overload in the Reuters organisation to

examine the influences on information overload and to compare the effects on respondents in each country. Klausegger et al. (2007) also noted that since the majority of the questions in the questionnaire were limited to an ordinal scale there was a limitation to distinguish between actual and perceived information overload. Brief descriptions of some previous quantitative studies on information overload are listed in Table 4.2.

Table 4.2: Quantitative studies on information overload

Researchers	Data collection technique	Unit of analysis and study focus
Dawes and Sampson (2003)	Content analysis	Systematic review of 19 studies on information seeking behaviour by clinical physicians.
Klausegger *et al.* (2007)	Telephone interviews based on a standardised survey questionnaire	Data from 5 countries from the east and west studies on information overload.
Deveans and Kewley (2009)	Questionnaire	Survey was administered to 27 Blackhawk pilots and co-pilots to identify what pieces of information are important to the pilots when they are in the cockpit.
Gao et al. (2010)	Observation and questionnaire	72 students were observed and were each given 30 multiple-choice questions to investigate the effect of quality and quantity of information on individuals' satisfaction on purchasing decision.
Karr-Wisniewski and Lu (2010)	Content analysis and web-based questionnaire	Content analysis of existing literature and web-based survey on 111 knowledge workers were used to find the organisational effects of information, communication, and system feature overload.
LexisNexis South Africa (2010)	Web-based questionnaire	The study was performed from June 2010 to July 2010 in South Africa among 100 legal professionals based on an online survey.
Prasitratanaporn (2010)	Self-administered structured questionnaire	The study used questionnaires administered to 594 workers in organisations in Bangkok to determine personal factors which caused individuals to perceive that they were overloaded with work-related information.
Soucek and Moser (2010)	Questionnaire	Data were collected from 90 employees using questionnaires to evaluate a training intervention on coping with certain facets of information overload.
Fowler and Hammell (2011)	Experimental data	Research used data from existing data mining applications into a system to identify and trap malicious cyber activity.
Messner and Wänke (2011)	Structured observation and questionnaire	180 students from a European university were chosen to evaluate the relationship between information overload and satisfaction when presented with many product choices.
Bontcheva *et al.* (2013)	Online questionnaire	Study to investigate aspects of usage of user-generated media, such as Facebook, LinkedIn and Twitter.
Rodriguez, Gummadi and Schoelkopf (2014)	Data collected from timestamps of tweets received & forwarded	A study of information overload experienced by Twitter users.

Table 4.2 shows the study focus and unit of analysis of some previous studies on information overload that used quantitative approaches as part of the data collection method. Based on this, it is clear that quantitative studies on the subject of information overload have been conducted in a variety of industries, such as the air force, tertiary education, legal, business and health.

4.7.2 Qualitative research

Qualitative research refers to any type of research that produces findings not arrived at by statistical procedures or other means of quantification (Strauss & Corbin, 1998). Basically, qualitative approaches are usually used to explore new phenomena and to capture individuals' thoughts, feelings, or interpretations of meaning and process (Given, 2008).

For instance, to find how information overload influenced middle management decision making, Carlevale (2010) gathered lived experiences of 22 middle managers at a defence company in California by using in-depth interviews. Koroleva, Krasnova and Günther (2010) employed observation and semi-structured in-depth interviews with 12 Facebook users to investigate the main sources of information overload and identify strategies to deal with it.

Table 4.3 identifies a selection of previous studies on information overload that had adopted qualitative methods.

Table 4.3: Qualitative studies on information overload

Researchers	Data collection technique	Unit of analysis and study focus
Edmunds and Morris (2000)	Systematic literature review	The study showed that the problem of information overload has existed for many years and is becoming more widely recognised and experienced.
Brennan (2011)	Content analysis and action research	The study analysed the inefficiencies surrounding the management of information in the workplace by using narrative analysis and action research.
MacDonald *et al.* (2011)	Case study, interviews and direct observation	This exploratory, multiple case study used direct observations in 19 semi-structured interviews with 19 managers in the healthcare services located in Nova Scotia, Canada.
Schornac and Beck (2011)	Interviews	The study incorporated the preliminary findings from interviews with 429 executives to propose a model of knowledge management as a way for unifying knowledge and information needs in their organisations.
Velez-Rojas et al. (2011)	Interviews with open-ended questions	Interviews with 10 managers and operators of an enterprise IT environment regarding the challenges they faced when dealing with large and complex network systems that were overloaded with information.
Koltay (2012)	Systematic literature review	The study emphasised the relationship between information architecture and information overload in view of the benefits of information literacy and digital literacy.
Mungly and Singh (2012)	Systematic literature review	The study investigated how information overload experienced by telework impacted on family life.
Hersberger (2013)	In-depth interviews, observations and content analysis of field note data	Data was collected for homeless parents in 6 shelters to investigate how the lack of access to information technology affected how the homeless accessed basic needs level information.
Klerings *et al.* (2015)	Literature searches and citation tracking of recent literature	The study posited that the main problem is not that there is ''too much information'', but that the traditional means of evaluating information are ill suited to the realities of the digital age in the healthcare sector.
Savolainen (2015)	In-depth analysis of articles, conference papers and books	Article to specify cognitive barriers to information seeking for individuals.
van Knippenberg *et al.* (2015)	Thematic review of literature	Explored how information-rich context is changing behaviour, workplaces, organisations, and institutions.

Table 4.3 shows that although the various qualitative research methods can have common characteristics in terms of data collection, there are a variety of study approaches, based

on different fields of knowledge within, for instance, business management, workspace behaviour, health, IT and library.

4.7.3 Mixed method research

While the quantitative method provides an objective measure of reality, the qualitative method allows the researcher to explore and better understand the complexity of a phenomenon (Williams, 2007). Mixed methods research builds on both quantitative and qualitative approaches as the combination provides a better understanding of a research problem or issue than either research approach alone (Creswell et al., 2016).

According to Tashakkori and Teddlie (2010), mixed methods research has been recognised as a third methodological movement, complementing the existing traditions of quantitative and qualitative movements (Tashakkori & Teddlie, 2010). This development has been accompanied by a search for an appropriate paradigm to provide a legitimation for the use of mixed methods comparable to the paradigms that have been widely accepted as justifying the use of quantitative and qualitative methods separately. A research paradigm is a set of fundamental assumptions and beliefs as to how the world is perceived which then serves as a thinking framework that guides the behaviour of the researcher and addresses the philosophical dimensions of social sciences (Wahyuni, 2012).

The paradigm (or worldview) that researchers work in is most often consistent with their beliefs about the nature of reality, their philosophical views, and the scientific field or scholarly community they are part of (Graff, 2012).

The philosophical foundation of mixed methods research is based on the positivism paradigm or post-positivism paradigm, the philosophy associated with quantitative research, as well as the constructivism paradigm, the philosophy associated with qualitative research (Creswell, 2013). Simply, the positivist notion of a singular reality, the one and only truth that is out there waiting to be discovered by objective and value-free inquiry underpins quantitative research methods. Unlike positivists, constructivism is contrasted with the idea that there is no such thing as a single objective reality and that ‘‘subjective inquiry is the only kind possible to do’’ and for that reason constructivists favour qualitative research methods (Feilzer, 2010).

According to Teddlie and Tashakkori (2009), the approach most commonly associated with mixed methods research is pragmatism, which offers an alternative worldview to those of positivism, post-positivism and constructivism and focuses on the problem to be researched and the consequences of the research. Pragmatism offers an epistemological justification via pragmatic epistemic values or standards and logic by combining methods and ideas that helps to best frame, address, and provide tentative answers to research questions for mixing approaches and methods (Johnson, Onwuegbuzie & Turner, 2007). Pragmatism allows the researcher to be free of mental and practical constraints imposed by the contradiction between post-positivism and constructivism, and researchers do not have to be forced to use a particular research method or technique (Feilzer, 2010).

Mixed method research is not without disadvantage. For example, if a researcher leans toward a particular research methodology, the research could suffer from bias unless adjustments are made to account for a methodology which is not a strength for the researcher (Moss, 2011). There is also the problem of poor quality research, masquerading as mixed methods, often violating basic assumptions of both methodologies (De Lisle, 2011). Another issue that emerged as potentially needing additional consideration in future mixed methods works is at what point in the design stage (e.g. data collection, integration, …) the methods should be mixed (Johnson et al., 2007).

Li and Li (2011) used mixed methods to investigate the relationship between information overload with work efficiency and work quality. The instruments used were questionnaires as well as open-ended questions which were administered to 29 managers of a training class to depict the common trait in the work process. Some other studies on information overload employing mixed research methods are listed in Table 4.4.

Table 4.4: Mixed methods studies on information overload

Researchers	Data collection technique	Unit of analysis and study focus
Whittaker and Sidner (1996)	Mailbox analysis and interviews	This study conducted a quantitative analysis of the mailboxes of 20 users, along with 34 hours of interviews to address the way people organise and manage enormous amounts of information.
Whelan and Teigland (2010)	Online questionnaire, semi-structured interviews and social network analysis of human behaviour and social structures	The findings show that human filters, specialised individuals in information, are needed to filter the abundance of information for internal use. The questionnaires were used to identify consumers and producers of information. The interviews were for exploring the information overload and the filtering activities of key personnel.
Chen, Pedersen and Murphy (2011)	Questionnaires and semi-structured interviews	This study explored the sources of online students' information overload and offered suggestions for increasing students' cognitive resources for learning. Data obtained from the questionnaire were used to support the findings from the interviews regarding the research question.
Jackson and Van den Hooff (2012)	Questionnaires and interviews	Study to explore the relationship between e-mail interaction and the negative effects of e-mail use, such as information overload and miscommunication.
de la Rouviere and Ehlers (2013)	Data from 31684 Twitter accounts and qualitative survey of 115 users	Study showing that when following too many users on online blogging services, information overload occurs due to increased and varied communication activity.

Table 4.4 presents the central study focus from each survey as well as key information on its methodologies adopted. The aim of using both quantitative and qualitative methods was to seek convergence and increase validity as both results were elaborated and enhanced.

4.7.4 Methodology adopted for this study

This study used a mixed method design that combines procedures for collecting and analysing both quantitative and qualitative data in the context of a single study. The justification for mixing the two methods was that mixed methods would provide significant

opportunities to gain a deeper understanding of complex information overload issues than would be possible with the use of either quantitative or qualitative data alone. The qualitative data provides a deep understanding of online survey responses, and statistical analysis can provide detailed assessment of patterns of responses from the quantitative data.

The quantitative aspect of the data collection for this study aimed at determining awareness, effect and sources of information overload amongst employees. This data collected was also used to compare the level of information overload amongst companies in the shipping industry. To collect data, an online easy to understand questionnaire format was used with one open-ended response question, so that respondents could take advantage of posting extensive comments.

Adding a qualitative component, investigating the experiences of top managers with information overload in terms of awareness, impact and prevention, would undeniably add significant insights to such a study. The qualitative methods were used to establish guidelines for good practice for managing information overload phenomena about which little is yet known in the shipping industry. The qualitative method was also used to gain new perspectives on information overload and to gain more in-depth information that might have been difficult to convey quantitatively. The qualitative data was collected by interviewing high-level managers.

According to (Creswell *et al.*, 2016), there are four general strategies in mixed methods procedures:

- Explanatory sequential design: Start by collecting quantitative data followed by qualitative data. The intent of this design is to use qualitative findings to help clarify and explain certain quantitative results.
- Exploratory sequential design: Start by collecting qualitative data followed by quantitative data and then interpret how quantitative results explain the qualitative results.

- Convergent parallel mixed methods design: Collect and analyse quantitative and qualitative data at the same time. This is used to develop a more complete and valid understanding of the phenomenon of interest.
- Advanced mixed methods design: The researcher embeds one or more of the other three basic mixed methods design with a larger methodological, programmatic, or theoretical framework.

This study adopted the convergent parallel mixed methods design as the study involved people from diverse backgrounds with their own agenda and expectations. This design method was also most suitable as both types of data were collected at the same time about the same problem of information overload so as to mix or integrate the different results, such as comparing and contrasting them to produce well-validated conclusions. The parallel and convergent aspects are illustrated in Figure 4.2.

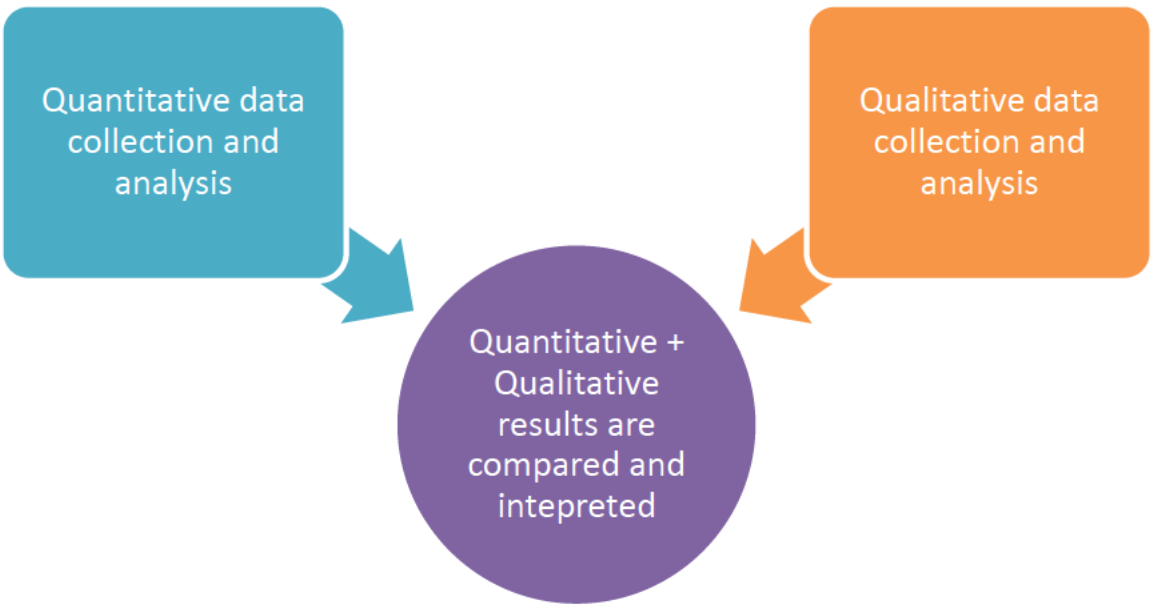

Figure 4.2: Convergent parallel mixed methods design
Source: Adapted from Creswell *et al.* (2016)

A three-phased plan consisting of a pilot study, data collection using online questionnaires and structured interviews was adopted for this study. The pilot study was conducted to test the data collection instruments.

4.8 LOCATION OF THE STUDY

This study applied its focus in the form of an assessment of decision makers, managers and office workers in the shipping companies in Durban, South Africa, in order to evaluate the problem of information overload on their work performance and stress.

The South African shipping industry was chosen because firstly, South Africa is a leading foreign direct investment (FDI) destination on the African continent as it attracts investors looking to set up their African headquarters (Games, 2012), and secondly, shipping is a prime factor of accomplishing economic gains from international commodity trade (Lee & Lee, 2012).

Durban is the largest port in Africa and houses the largest container terminal in the Southern Hemisphere (Transnet Port Terminals, 2015; World Shipping Council, 2015; Ports & Ships, 2016). Based on the researcher's association with the shipping industry, it was evident from visual observation and informal discussions with staff that they were being overloaded with information since the introduction of modern communication technologies such as the Internet, e-mail, and other corporate information systems and technologies. However, no empirical evidence was available to prove that information overload existed or that it was being managed properly within the Durban shipping industry.

This study was conducted among managers and office workers in the shipping companies located in Durban. The Durban shipping industry was chosen as the Durban Container Terminal is Africa's biggest and busiest terminal (Transnet Port Terminals, 2015; World Shipping Council, 2015; Ports & Ships, 2016).

Another influential factor for choosing the shipping industry was that the researcher has over 20 years of experience in the IT industry focusing on the shipping industry.

Twelve shipping companies were chosen based firstly on prima facie evidence that information overload existed in these companies. Secondly, these 12 leading shipping companies were chosen based on the size of the companies by number of employees, such as small, medium and large and their turnover.

The investigator must also determine before beginning the research exactly what the unit of analysis in the study will be.

4.8.1 Unit of analysis

The unit of analysis defines what the study is focusing on, such as an individual, a group, an organisation, a city, and so forth (Berg, 2001). According to Sekaran (2009), the unit of analysis is determined by the problem statement and research question.

As the research question was twofold, to check whether information overload exists in the South African shipping companies and whether it is being managed if it does exist, data was collected from individual employee (quantitative section) and management (qualitative section) respectively. Therefore, the unit of analysis for the quantitative study was the employees in the shipping industry, and for qualitative study the management of the shipping industry was the unit of study.

It is necessary to determine the unit of analysis since the data collection methods and sample size are guided by the level at which data are collected for analysis (Sekaran, 2009). The next section describes the population and the sample as well as the sampling procedure that was used to obtain a sample for this study.

4.9 THE POPULATION AND SAMPLE

It is usually impossible to include the entire population in a study in research investigations involving several hundreds or even thousands of elements (Berg, 2001; Sekaran, 2009). The main restrictions are time, cost, permissions and sometimes access to participants (Sekaran, 2009; Creswell *et al.*, 2016; Saunders *et al.*, 2016). Consequently, in the majority of surveys, especially where the population that is being studied is fairly large, the use of sampling is required (Creswell *et al.*, 2016).

Within the broad process of sampling, choosing the actual sample is the second step in a two-step process, which begins with defining the population that is eligible for inclusion in the sample (Given, 2008).

4.9.1 The population

The population is the full set of cases from which a sample can be selected (Saunders et al., 2016). A population is the total collection of elements about which we want to make inferences (Blumberg et al., 2011). According to Robinson (2014), the first concern is defining the target population which is also called the study population or sample universe.

The shipping industry in South Africa comprises approximately 370 companies (Altius Directory, 2016; Kompass International, 2016). Of this broad population, 249 (67%) are located in the KwaZulu-Natal (KZN) province in the city of Durban (Kompass International, 2016). According to African Business Central (2015), Durban is the busiest port in South African and the second busiest in Africa, hence, the study was located in KwaZulu-Natal.

Because most populations are extremely large, it is impractical or impossible to truly sample from the population. Consequently, most researchers use a sample drawn from a sampling frame or subset of the larger target population (Weathington, Cunningham & Pittenger, 2012).

4.9.2 Sampling

Sampling can be defined as the deliberate choice of a number of units (the sample) who are to provide the data from which one can draw conclusions about some larger group (the population) that these units represent (Jankowicz, 2005). Likewise, Sekaran (2009) describes sampling as the process of selecting a sufficient number of elements from a population so that by studying the sample, and understanding the properties or the characteristics of the sample subjects, it would be possible to generalise the properties or characteristics to the population elements. Some, but not all, elements of a population would form a sample (Sekaran, 2009). It is a general feature of social enquiry to design and select samples for study, whether the research is qualitative or quantitative in form (Ritchie, Lewis, Nicholls & Ormston, 2013). Furthermore, to delineate a sample universe, a set of inclusion criteria or exclusion criteria, or a combination of both, must be specified for the study (Robinson, 2014).

Approaches to selecting samples are typically divided between probability sampling and non-probability sampling, with the former using a group size in the population as the sole

influence on how many of its members will be included in the sample, while the latter concentrates on selecting sample members according to their ability to meet specific criteria (Given, 2008).

Even though there are various methods according to which a probability and non-probability sample can be taken, there are some general methods identified in the literature. The different probability and non-probability sampling methods are described in Table 4.5.

Table 4.5: Sampling methods

Probability sampling methods	Non-probability sampling methods
Simple random sampling – Every individual in the sampling frame (i.e. desired population) has an equal and independent chance of being chosen for the study.	Convenience sampling – Choosing settings, groups, and/or individuals that are conveniently available and willing to participate in the study.
Systematic sampling – Choosing individuals from a list by selecting every n^{th} sampling frame member, where k typifies the population divided by the preferred sample size.	Quota sampling – Researcher identifies desired characteristics and quotas of sample members to be included in the study.
Stratified sampling – Sampling frame is divided into sub-sections comprising groups that are relatively homogeneous with respect to one or more characteristics and a random sample from each stratum is selected.	Purposive sampling – The researcher uses their own judgement to select the sample and the subjects are selected based on their expertise.
Cluster sampling – Selecting intact groups representing clusters of individuals rather than choosing individuals one at a time.	Snowball sampling – Participants are asked to recruit individuals to join the study.

Source: Neergaard & Ulhøi (2007), Onwuegbuzie & Collins (2007), Teddlie & Yu (2007), Kothari (2009), Sekaran (2009), Ritchie *et al.* (2013), Greener & Martelli (2015) and Creswell *et al.* (2016)

According to Hair, Wolfinbarger, Money, Samouel and Page (2015), the researcher must first decide on the sampling design before collecting data. Hair et al. (2015) added that the sampling process involves answering the questions illustrated in Figure 4.3.

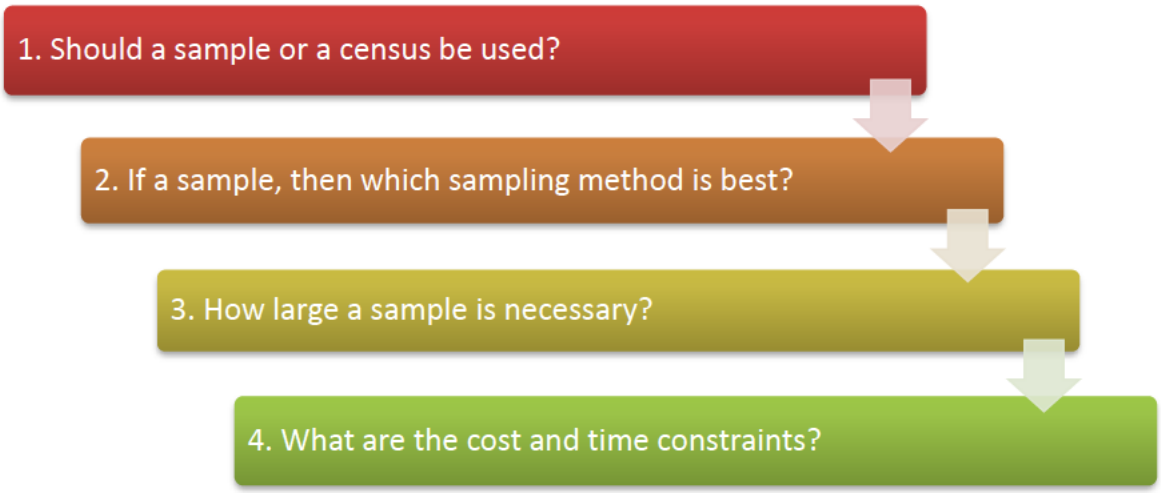

Figure 4.3: Sampling process

Two sampling techniques were used in this study for collecting data. Judgement sampling was used for the quantitative method and a census method was used for the qualitative method.

Based on the ease of access to companies, the researcher applied judgement sampling in selecting the companies to participate in this study. Twelve companies were selected where the researcher had access to decision makers who would be willing to support the study. In order to reduce bias and achieve representivity, company size (small, medium and large) in terms of their turnover and the number of employees, was used to categorise the participating companies to allow for comparison of the extent of information overload across and within companies.

For the quantitative study, a census method was used to get all the 12 companies to participate. To determine the population for the quantitative study, the staff of the 12 companies were added which totalled 491 units. Based on this population to ensure generalisability, a minimum sample of 396 participants is required. However, due to the small numbers employed in each company, a census was adopted to get all members of the population to participate.

Each of the 12 organisations provided the e-mail address of each employee together with the department in which they worked. Due to the small numbers employed in each company, the link to the survey was sent via email to all employees rather than just a random sample of that population.

The sampling technique selected for the qualitative method of this study was a purposive judgement non-probability sample with the sample units being determined on the basis of personal judgment and not with the sample unit having a known, non-zero probability of selection (Sekaran, 2009).

Purposive judgement sampling techniques involve selecting certain units or cases (e.g. individuals, groups of individuals, institutions) based on a specific purpose rather than randomly (Teddlie & Yu, 2007). Purposive sampling enables researchers to use their judgement to select cases that will best enable them to answer their research question(s) and to meet their objectives (Jankowicz, 2005; Saunders et al., 2016).

Since the aim of this study was to establish whether information overload exists in South African shipping companies and if it is being formally managed, sampling for "subjects who are most advantageously placed or in the best position to provide the information required" (Sekaran, 2009, p.230) was the focus. This approach is different from simple random sampling in quantitative research, which is used to make generalisations.

As one central aspect of the study dealt with the awareness and management of information overload, it was important to ensure that the survey was directed to the persons who mostly likely make strategic decisions. Therefore, purposive judgement sampling was the most appropriate to identify these high-level strategic managers or decision makers.

A non-probability sampling approach is practical and economical and is sometimes the only meaningful way to investigate (Sekaran, 2009; Saunders *et al.*, 2016). A disadvantage of purposive sampling is that the sample cannot claim to be representative which limits the generalisability of the research results (Hair *et al.*, 2007; Teddlie & Yu, 2007; Sekaran, 2009).

In addition to selecting the samples for the qualitative and quantitative components of a study, mixed methods researchers should furthermore determine suitable sample sizes for each phase (Onwuegbuzie & Collins, 2007). Onwuegbuzie and Collins (2007) added that the choice of sample size is as important as the choice of sampling scheme since it also determines the extent to which the researcher can make statistical and/or analytic generalisations (Onwuegbuzie & Collins, 2007).

Having chosen the judgement sampling, non-probability purposive judgement sampling and census method techniques for this study, the final part of the research design involved specifying the sample size and constraints.

4.9.3 Sample size

Surveys are useful and powerful in finding answers to research questions, but can do more harm than good if not correctly targeted (Sekaran, 2009). She added that if data is not collected from the people or objects that can provide the correct answers to solve the problem, the survey will be in vain. Only rarely can a researcher look at everything that has potential relevance for the research problem (Leedy & Ormrod, 2010).

Blumberg *et al.* (2011) listed the following factors regarding the size of a sample needed:

a) A sample must be large or it is not representative.

b) A sample should bear some proportional relationship to the size of the population from which it is drawn.

Moreover, the size of a sample depends in part on the size of the margin of error one is prepared to accept and the size of the population from which one is going to take the sample (Fisher, 2004).

In addition, according to Kothari (2009), a good sample should have the following characteristics:

a) Sample design must result in a truly representative sample.

b) Sample design must result in a small sampling error.

c) Sample design must be viable in the context of funds available for the research.

d) Sample design must be such that systematic bias can be controlled in a better way.

e) Samples should be such that the results of the sample study can be applied, in general, for the universe with a reasonable level of confidence.

Jankowicz (2005) suggested that statistical theory can be used to compute the sample size. Hair *et al.* (2015) argued that irrespective of how the sample size is determined, it is essential that it should be a sufficient size and quality to yield results that are seen to be credible in terms of their accuracy and consistency. If the population is very diverse on many characteristics, then the sample may need to be larger to fully reflect this diversity. A large sample, however, is not a guarantee that the sample will accurately reflect the population (Weathington *et al.*, 2012).

As stated before, the population for this study comprised the organisations in the shipping industry in Durban, South Africa. According to Altius Directory (2016) and Kompass International (2016), the population for this study comprised of the 370 shipping companies operating in the Durban area.

In terms of accuracy and consistency, it would have been desirable to collect data from all members of the population under investigation. However, contacting the entire population generally would be very costly and time consuming (Hair *et al.*, 2007).

The target population consisted of 12 decision makers and 491 employees from shipping organisations in the Durban area in each of the 12 selected organisations. The selected organisations had to meet one of the following criteria in order to be included as respondents and participants:

a) The organisation's primary business had to be in the shipping industry.

b) The employees had to have access to the Internet to be able to participate in the online survey.

c) At least one decision maker or senior manager had to be willing to answer the interview questions.

Table 4.6 represents the distribution of the population and sample group by company.

Table 4.6: Possible respondents per company

Company	Size	Information workers		Decision maker/ Senior managers
		Population=N	Sample=n	
Company A	Small	20	19	2
Company B	Small	18	17	1
Company C	Small	18	18	1
Company D	Small	17	17	1
Company E	Small	14	14	1
Company F	Medium	21	20	1
Company G	Medium	24	23	1
Company H	Medium	23	22	1
Company I	Medium	46	42	1
Company J	Medium	37	34	2
Company K	Large	150	97	1
Company L	Large	103	73	1
Total		**491**	**396**	**14**

Generalisability was key to this study and therefore an attempt was made to ensure that all units of the population participate. As such, a census sampling approach was used where all members of the population were surveyed. As per Table 4.6, the total number of possible respondents that could be included in the quantitative sample was 491 and for the qualitative sample the number was 14. According to Fisher (2004), a return rate of 70% may be attainable when the questionnaires are distributed to known respondents.

The sampling frame was the e-mail addresses of the employees provided by the managers of the companies under study.

Having described the population for this study and strategies that were used to draw the sample, as well as the sample size, it is appropriate to describe the research instruments, which were used for gathering data. These are described in the next section.

4.10 DATA COLLECTION

Data can be collected in a variety of ways, in different settings, and from different sources (Sekaran, 2009). Most business researchers collect empirical data for their research projects and use various types of data collection methods for this purpose (Eriksson & Kovalainen, 2008). The type and amount of data collected depends upon the nature of the study together with its research objectives (Hair *et al.*, 2015).

Quantitative data involves gathering numerical data using structured questionnaires or observation guides to collect primary data from individuals (Hair *et al.*, 2007). In qualitative research, empirical data can be collected through the use of focus groups, personal interviews, by observing behaviour or events, or by asking the participants to write, e.g. diaries, stories (Hair *et al.*, 2007; Eriksson & Kovalainen, 2008).

When choosing a research method, researchers should be aware that it is a matter of deciding which is the most appropriate method in practice, not of deciding that one data collection method is superior to all others in any absolute sense (Denscombe, 2003). Sekaran (2009) added that because almost all data collection methods have some bias associated with them, collecting data through multi-methods and from multiple sources lends rigour to research. For instance, if the responses collected through interviews, questionnaires, and observation are strongly correlated with one another, then the researcher will be more confident about the goodness of the collected data (Sekaran, 2009).

A variety of data collection methods could be used for this study. However, an electronic questionnaire was used to obtain the quantitative data and the qualitative data was gathered using structured interviews.

4.10.1 Data collection instruments

Sekaran (2009) emphasised that interviewing, administrating questionnaires, and observing people and phenomena are the three main data collection methods in survey research. Weathington *et al.* (2012) defined research methods as techniques used to acquire information and reach reasonable conclusions. The data collection method can

influence the accuracy and reliability of survey data and it is therefore very important to select the correct method (Hair *et al.*, 2015).

The main instruments that were used in this study are described in the subsequent paragraphs.

4.10.1.1 Interviews

Sekaran (2009) defines an interview as a two-way conversation initiated by an interviewer to obtain information from a participant. Hair *et al.* (2015) stated that interviews are particularly helpful in gathering data when dealing with complex and/or sensitive issues, and when open-ended questions are used to collect data. The aim of interviews is to see the world through the eyes of the participant, and they can be a valuable source of information (Creswell *et al.*, 2016). Interviews can help to gather valid and reliable data that are relevant to the research questions and objectives (Saunders *et al.*, 2016).

Interviews may be unstructured, semi-structured or structured, and conducted face to face, by telephone, or online (Sekaran, 2009; Kumar, 2010; Blumberg *et al.*, 2011).

A structured interview is very flexible in term of contents, questions and sequence. The interviewer has complete freedom in terms of the wording to use and the way to explain questions to the respondents and may even formulate questions and raise issues on the spur of the moment, depending upon what occurs in the context of the discussion (Kumar, 2010). An unstructured interview often takes the form of a conversation with the intention that the researcher, with the participant, explores their views, ideas, beliefs and attitudes about certain events or phenomena (Creswell *et al.*, 2016).

In a structured interview, the researcher asks a predetermined set of questions using the same wording and order of questions as specified in the interview schedule (Kumar, 2010). An interview schedule is a written list of questions, open ended or closed, developed prior to the interview taking place (Kumar, 2010; Creswell *et al.*, 2016). Structured interviews may provide important background or contextual material for a study especially when the research design adopts an inductive approach, such as in the development of grounded theory (Saunders *et al.*, 2016).

Structured interviews are conducted when it is known at the outset what information is needed (Sekaran, 2009). Unstructured interviews are useful if the research problem refers to a wide-ranging problem area and the researcher needs to detect and identify the issues relevant to understanding the situation (Blumberg *et al.*, 2011).

One of the main advantages of interviews (structured and unstructured) is the opportunity for detailed feedback (Zikmund, Babin, Carr & Griffin, 2013). The main disadvantages of interviews include the following (Zikmund *et al.*, 2013):

- Respondents are not anonymous and as a result may be reluctant to provide confidential information to another person.
- Personal interviews are expensive, generally substantially costlier than mail, internet, or telephone surveys.

Interviews are one method of gathering more in-depth insights on participant attitudes, thoughts, and actions (Harris & Brown, 2010).

4.10.1.2 Questionnaires

A questionnaire is a pre-formulated written set of questions to which respondents record their answers, usually within rather closely defined alternatives (Sekaran, 2009). A questionnaire can be either printed or electronic and may be administered personally, collectively administered, mailed to prospective respondents or electronically distributed (Sekaran, 2009; Kumar, 2010). Figure 4.4 shows the various ways in which questionnaires can be administered.

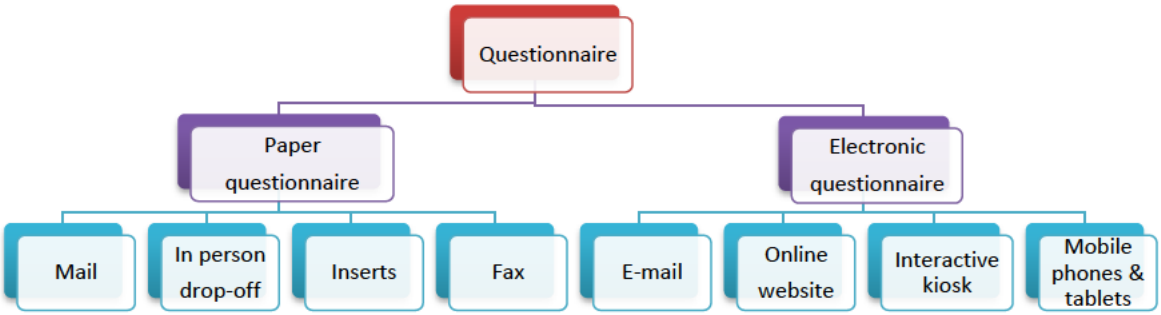

Figure 4.4: Administration of questionnaires
Source: Zikmund *et al.* (2013)

According to Collis and Hussey (2013), the aim of a questionnaire is to find out what a selected group of participants think and feel about a particular subject or topic.

The main advantages of questionnaires:

- There is no face-to-face interaction between respondents and interviewer; therefore this method provides greater anonymity. In some situations where sensitive questions are asked, it helps to increase the likelihood of obtaining accurate information (Kumar, 2010).
- It is less expensive than personal interviews in terms of time, human and financial resources (Blumberg *et al.*, 2011).
- When using mail questionnaires, researchers can contact participants who might be difficult to contact personally or on the phone (Blumberg *et al.*, 2011).

The main demerits of a questionnaire:

- It is difficult to know whether willing respondents are truly representative (Kothari, 2009).
- It is limited to a study population that can read and write. It cannot be used on a population that is illiterate or very young (Kumar, 2010).
- It has a low response rate (Blumberg *et al.*, 2011).

4.10.1.3 Data collection for this study

The data collection method can influence the accuracy and reliability of survey data and it is therefore very important to select the correct method (Hair *et al.*, 2015). The research approach used for this study can be epitomised as a mixed method research consisting of one questionnaire and one semi-structured interview guide. The review of literature, presented in Chapters Two and Three, helped the researcher to develop the questionnaire instrument and interview protocol.

Interviews were chosen to collect qualitative data because the format allowed for significant probing, face-to-face and a two-way communication, that provided in-depth descriptions of topics being discussed. Furthermore, the number of people interviewed was fairly small (one per company) and qualitative semi-structured interviews were able to provide significantly more data around a particular topic than a questionnaire alone.

Although interviewing has the advantage of flexibility in terms of adapting, adopting, and changing the questions as the researcher proceeds with the interviews, questionnaires have the advantage of obtaining data more efficiently in terms of researcher time, energy, and costs (Sekaran, 2009). On the other hand, qualitative data from interviews enriched the understanding of managers' experience of information overload and methods for controlling the increasing use of electronic information within the organisational setting.

Quantitative research is used to answer questions about relationships among measured variables with the purpose of explaining, predicting, and controlling phenomena (Leedy & Ormrod, 2010). The electronic questionnaire method was appropriate for the quantitative section of this study where the researcher had to gather data from a large sample, it was easy to administer, and the respondents had to be computer literate and have access to an online computer.

4.10.2 Questionnaires as a research tool for the quantitative method

Collis and Hussey (2013) defined a questionnaire as a list of carefully structured questions, chosen after considerable testing, with a view to eliciting reliable responses from a chosen sample. Electronic questionnaires can be administered by e-mail or be web-hosted on the

Internet or on companies' intranets (Zikmund *et al.*, 2013; Hair *et al.*, 2015; Ruel, Wagner III & Gillespie, 2015).

In conducting a questionnaire-based study, there are many interrelated activities that must be considered. These include: the general design of the questionnaire, validation of the questionnaire by pretesting, and the method by which the questionnaire is administered (Hair *et al.*, 2015).

Questionnaires are handed out to the target population to evaluate attitudes, knowledge and behaviour. They enable the researcher to gather information from a large number of people, rapidly, over extended coverage, and are one of the lowest cost methods (Blumberg *et al.*, 2011). However, there are problems experienced with questionnaires as a method for data collection. Furthermore, self-administered questionnaires require a greater degree of careful wording, layout, and explanation because each respondent will be expected to understand not only the questions, but also the instructions and context for the questionnaire, in the same manner as all the other people who complete that questionnaire (Ruel *et al.*, 2015).

Questionnaires can be very effective when large numbers of people are to be reached in different geographical regions (Sekaran, 2009). They are also useful for collecting a large sample of views which can be used to improve decision making in business (Hair *et al.*, 2015). Furthermore, web-based surveys are very effective instruments compared to traditional mail surveys. In a web-based survey the respondent must go to the URL or website where the survey is housed (Ruel *et al.*, 2015).

For the quantitative section of this study, an electronic questionnaire method was effective. This is because the electronic questionnaire has a wider access and better coverage, is inexpensive, and produces high quality of data (Hair *et al.*, 2015; Ruel *et al.*, 2015). Further advantages of using electronic questionnaires for this study are: responses can be quantified (Sekaran, 2009), easily summarised and the returned questionnaire is easy to analyse (Kothari, 2009). Questionnaires can provide a large volume of data and information, to be tabulated using any computerised spreadsheet, while confidentiality of respondents is maintained (Blumberg *et al.*, 2011). Contrary to the latter, there are also some demerits when using questionnaires, for example, low response rate (Sekaran, 2009),

cannot be long or complex (Gaiser & Schreiner, 2009; Ruel *et al.*, 2015), and follow-up of non-responses is difficult (Hair *et al.*, 2015).

The design of the questionnaire followed the recommendations of Gaiser and Schreiner (2009), Hair *et al.* (2015) and Creswell *et al.* (2016), on how to achieve a high response rate and high quality responses which are detailed in the next section.

4.10.2.1 Questionnaire design

To achieve high response rates and high quality responses, particular attention was paid to the length of the questionnaire (Gaiser & Schreiner, 2009), the wording of the questions (Creswell *et al.*, 2016), as well as the manner in which the questions were structured, and coded (Hair *et al.*, 2015). Moreover, to ensure maximum confidentiality and anonymity of the questionnaire, no social or demographic data except race, gender and age were included in the questionnaire.

The questionnaire for this study (Appendix B) was based on the literature reviewed by the researcher (presented in Chapters Two and Three). The questions were ordered in such a way so as not to confuse the respondents. Easy-to-answer questions, such as biographical details were asked first so that the respondents could be put at ease. Questions of the same topics were kept together as per the literature review. The questionnaire consisted of the following six sections, following the logical flow of the literature review in Chapters Two and Three:

- Section 1: Demographics (8 questions)
- Section 2: Prior knowledge of information overload (3 questions)
- Section 3: Causes of information overload (9 questions)
- Section 4: Impact of information overload (11 questions)
- Section 5: Managing information overload (5 questions)
- Section 6: Additional comments and suggestions (1 open-ended question)

There are several considerations that need to be taken note of. The first consideration was to choose judiciously between open-ended and closed-ended questions.

In an open-ended question the possible responses are not given (Kumar, 2010). Collis and Hussey (2013) described open-ended questions as those to which each respondent can give a personal response or opinion in their own words, and described closed-ended questions as those to which a respondent's answer is selected from a number of predetermined alternatives. The covering letter and a sample questionnaire can be viewed in Appendix B.

The questionnaire was designed in such a way that respondents could respond electronically via a web browser. Closed-ended questions were included in the questionnaire. The aim was to make questions as easy and as clearly understandable as possible. Some questions can be seen as multiple questions within a question. The aim of this was to limit the number of questions in the questionnaire.

Because the researcher only wanted accurate information from the respondents, it stood to reason that the respondents knew exactly what was being asked of them. With this in mind, technical terms were avoided. Thus, in the questionnaire, only known and generally accepted technical words and terms were used. The questions were formulated with the intention that the words used were simple, clear and concise (Hair *et al.*, 2015). Likewise, the questions were brief and clear instructions were given for each question.

The questionnaires were designed in such a way that the individual questions were ordered and grouped into six sections. The form of these questions and the order in which they appeared in the questionnaire is a very important aspect (Hair *et al.*, 2015). The order is important as earlier responses could have affected subsequent responses. Accordingly, questions that were related to the same concept were grouped and sequenced under the same section so that respondents did not have to continually switch their focus.

Hair *et al.* (2015) pointed out that the longer a question is, the more likely it will be misunderstood by respondents. Hair *et al.* (2015) explained that long questions have higher non-response rates and produce more errors in responses – respondents tend to answer long questions before fully reading them because they are in a hurry to complete the questionnaire. For this reason, questions were kept as brief as possible.

Questions 1 to 36 were all closed-ended questions. Dichotomous, category, Likert type and ranking scales were used for closed-ended questions.

A five-point Likert type scale was used for Questions 20 to 24 and Questions 27 to 30 where respondents had to select from five alternative responses. The Likert scale was anchored to 1 (Strongly Agree), 4 (Strongly Disagree) and 5 (Not Applicable). A Likert scale is the most frequently used type of scale (Blumberg *et al.*, 2011).

According to Leedy and Ormrod (2010), a rating scale is more useful when a behaviour, attitude, or other phenomenon of interest needs to be evaluated on a continuum. An advantage of this method is that a number of different statements can be provided in a list which does not take up much space, is simple for the respondent to complete and simple for the researcher to code and analyse (Collis & Hussey, 2013).

Questions 9, 12, 14 and 26 presented the respondents with a rank order scaling type question with a range of opinions. Rank order scaling asks the respondents to put all the alternatives into rank order on some quality specified in the item (Jankowicz, 2005). The respondents had to rank each opinion in order of importance to them. This is useful as an alternative to open questions but has the drawback of taking considerable space (Collis & Hussey, 2013).

Together with the questionnaire, a covering letter (Appendix A) was administered, explaining the purpose of the questionnaire.

4.10.3 Structured interview as a research tool for the qualitative method

Interviews are optimal for collecting data on individuals' personal histories, perspectives, and experiences, particularly when sensitive topics are being explored (Mack, Woodsong, MacQueen, Guest & Namey, 2005). In a structured interview, the researcher follows a rigid procedure and seeks answers to a set of pre-conceived questions through personal interviews (Kothari, 2009).

As previously stated, for the qualitative research section of this study, a structured interview was used. The qualitative data from interviews enriched the understanding of

managers' experience of information overload and methods for handling the expanding use of electronic communication within the organisational context.

According to (Mack *et al.*, 2005), the data collection instruments for interviews include interview guides, focus group guides, observation guides, and/or interviewer scripts. The interview guide lists the key issues and subtopics the interviewer should attempt to cover in the course of the interview (Ritchie *et al.*, 2013).

4.10.3.1 Interview guide design

The information presented in the literature review chapters together with the research questions were used to develop meaningful questions for the interview guide.

The design of the interview guide was based on the recommendations of Eriksson and Kovalainen (2008) and Sekaran (2009). Twelve open-ended questions were included in the interview guide. Simple questions were asked at the beginning of the interviews to get a broad impression about the information environment in the company. The ensuing questions were more indirect with the purpose of obtaining more detailed information about the staff perceptions of information overload. Questions that followed were more direct and tried to identify the direction the company is taking to control information overload. The researcher tried to reduce his influence by avoiding leading and suggestive questions. Moreover, all questions were designed to ensure the responses were as unbiased as possible. The interview guide is included in Appendix C.

The structure of the interviews attempted to maintain focus during the brief scheduled interviews. These interviews took place at the interviewees' offices. The time scheduled for each interview was a maximum of 30 minutes. All interviews were audio recorded using a digital voice recorder with pre-arranged permission from the participant. In addition to audio recordings, the researcher kept written notes (Patterson, 2013).

It was important for the measuring instruments, as described in this chapter, to be reliable and valid.

4.11 PRETESTING, RELIABILITY AND VALIDITY OF THE RESEARCH INSTRUMENTS

To establish the reliability and validity of the research instrument it is necessary firstly, to clarify these concepts and secondly to relate them to this study.

The concepts of reliability, validity and generalisability provide a basic framework for the evaluation of research (Eriksson & Kovalainen, 2008). (Collis & Hussey, 2013) explained that the validity and reliability of a measuring instrument are two aspects that are concerned with the findings of a research.

An instrument is valid if it is indeed measuring the concept it set out to measure and not something else (Sekaran, 2009). Reliability of an instrument means that if the same instrument is used at different times or administered to different respondents from the same population, the findings should be the same (Creswell *et al.*, 2016).

Pretesting an instrument, a questionnaire or an interview guide, is important as this ensures that the respondents will understand the questions and that there are no problems with the wording or measurement (Sekaran, 2009). Grimm (2010) added that pretesting is an absolutely necessary step to ensure that all kinds of errors associated with survey research are reduced, thus improving the quality of data significantly.

No questionnaire should be administered before the researcher has evaluated the likely accuracy and consistency of the responses.

4.11.1 Pretesting the questionnaire

According to Hair *et al.* (2015), the accuracy and consistency of the responses can be achieved by pretesting the questionnaire using a small sample of respondents with characteristics similar to the target population. The sample size in a pretest would likely be between 4 to no more than 30 (Hair *et al.*, 2015).

The draft questionnaire used in the interviews was first pretested with the supervisor and work colleagues to check its content validity and terminology and was modified accordingly. The modified questionnaire was then pilot tested to check its suitability and appropriateness for the target population. The pilot test of the electronic questionnaire was achieved by having four employees from two different companies (8 participants)

completing the questionnaire to ascertain if it was understandable and interpreted in accordance with the study. The pretest process was greatly facilitated by the computer, which enabled the production of a prototype model of the online questionnaire that was fairly similar to the end product. Based on feedback from the pretest, including the coding and analysis of the responses to individual questions, the questionnaire was refined by rephrasing some questions to exclude ambiguity. Moreover, the questionnaire was shortened to 37 questions loosely grouped into six sections for easy focus for the respondents. Such pretesting helped to rectify any inadequacies, in timing, before administering the instrument orally or through a questionnaire to a large number of respondents, and thus reduced bias (Sekaran, 2009).

4.11.2 Validation of the questionnaire

There are a number of different ways in which the validity of research can be measured – the three most popular are content or face validity, construct validity and hypothetical validity (Collis & Hussey, 2013). For the purpose of this study, only face and construct validity are explained.

Face validity simply indicates that the items that are supposed to measure a concept do so, on the face of it, by looking like they measure the concept (Sekaran, 2009). From the responses of pretesting of the questionnaire, face validity was achieved by meeting the overall quantitative objectives of the investigation of cause and effect of information overload. The researcher was confident that the initial test had face validity as the overall function of the questionnaire was met from the observed measurements obtained in the pilot study.

An instrument has construct validity to the extent that it can testify to how well the results obtained from the use of the measure fit the theories around which the test is designed (Sekaran, 2009). For example, motivation, warmness, seriousness, creativity, racial bias, and bedside manner are all constructs, in that none of them can be directly observed or measured (Leedy & Ormrod, 2010; Creswell *et al.*, 2016)

The construct validity could be demonstrated by content analysis, correlation coefficients, factor analysis, analysis of variance (ANOVA) studies demonstrating differences between

differential groups or pretest/post-test intervention studies, factor analysis, multi-trait/multi-method studies, etc. or by an accumulation of evidences (Brown, 2000).

The construct validity of the measuring instrument for this was investigated by correlation. Correlation examines the association between two metric variables, where the strength of the association is indicated by the correlation coefficient (Hair *et al.*, 2007). The questionnaire's reliability and validity was evaluated using Cronbach's alpha. Sekaran (2009) stated that the most popular test of consistency, reliability for scaled items is the Cronbach's coefficient alpha. Cronbach's alpha for each factor was computed first and then the overall coefficient alpha was calculated for the questionnaire as a whole.

4.11.3 Administration of the questionnaire

A questionnaire can be administered in different ways in order to collect data, namely through the mail, via fax, in person drop-off, over the telephone, electronically via e-mail or hosted internet website or mobile phones and tablets (Sekaran, 2009; Zikmund *et al.*, 2013). The advantages and disadvantages of each of the ways of administering the questionnaire were summarised by Bhaskaran (2008) and are presented in Table 4.7.

Table 4.7: Advantages and disadvantages of questionnaire administration

Method of administration	Advantages	Disadvantages
In-person Interviews	In-depth and a high degree of confidence in the data.	Time consuming, expensive and can be dismissed as anecdotal.
Mail surveys	Can reach anyone and everyone – no barrier.	Expensive, data collection errors, lag time.
Phone surveys	High degree of confidence on the data collected, reaches almost anyone.	Expensive, cannot self-administer, need to hire an agency.
Web/Online surveys	Cheap, can self-administer, very low probability of data errors.	All customers might not have an e-mail address/be on the Internet; customers may be wary of divulging information online.

Source: Adapted from Bhaskaran (2008)

The data had to be obtained in a manner that made for easy categorisation and coding (Sekaran, 2009). Questionnaires were administered electronically for this study. According to (Sekaran, 2009), more reliable data are likely to result from electronic questionnaires since the respondent can go back and forth and easily change a response, and various on-screen and off- screen stimuli are provided to sustain respondents' interest.

Generally, the companies included in the sample for this study were very willing to participate, even though the respondents were often very busy persons and it was difficult to get them to fill in the questionnaire. Thus, to try to obtain the maximum response rate, reminder invitation e-mails were sent to the outstanding respondents.

4.11.4 Pretesting the interview

Another essential element to the interview preparation is the implementation of a pretest or pilot test. The pretest assists the researcher in determining if there are flaws, limitations, or other weaknesses in the interview design and will allow the researcher to make necessary revisions prior to the implementation of the study (Turner III, 2010). A pretest of the interview questions provides the opportunity to perfect each question's concept and wording.

The researcher conducted the pretest of the interview guide with colleagues and two participants from the management sample. The interview questions were sent to the participants one week in advance. This was done to allow the participants to become familiar with the questions and to understand what was expected of them.

The initial interviews were face to face and were recorded on a digital voice recorder. These informal interviews and dialogues were conducted to locate and correct weaknesses in the development of the concepts and questions. The feedback from these informal interviews provided the researcher with information to ensure that he was following the proper protocol of data collection procedures to safeguard objectivity in data collection.

This phase was a relationship-building activity with the participant that consisted of reviewing the goals of the study and confirming expectations for the data collection process. It also included an opportunity for the respondent to ask questions.

Modifications were made to the interview guide based on feedback from pilot participants. The final interview guide used in the study is presented in Appendix C.

4.11.5 Validating the interview guide

Face validity was used to give quality, credibility, and trustworthiness to the qualitative section of this study. As previously mentioned, face validity refers to the extent to which it measures what it is supposed to measure (Sekaran, 2009). This is difficult in human sciences, since the instruments need to measure human emotions like anger and happiness (Creswell et al., 2016). Creswell et al. (2016) added that this type of validity should be scrutinised by experts in the field to ensure a high degree of face validity.

The interview was comprehensive as the interviewees were either business leaders and decision makers of the companies, not just interviewees to support any pre-existing ideas of the researcher. The pretesting of the interview helped in highlighting ambiguous, difficult and unnecessary questions. The pretesting also helped in adjusting the number of questions by considering the time taken to complete the interview and furthermore helped in ensuring that the research objectives were covered by the questions. Lastly, pretesting interviews helped the researcher to practice and perfect the interviewing techniques.

After testing and checking the validity and reliability of the research instruments, the researcher needed to determine best data capturing methods as well as analyse the collected data. This is explained in the next sections.

4.12 DATA CAPTURING METHODS

The survey was hosted on QuestionPro (http://www.questionpro.com/), an on-line survey hosting website. An electronic questionnaire was chosen primarily because one of the characteristics or requirements for a respondent was to have access to a computer with access to the Internet.

E-mail addresses of the prospective respondents were obtained from the organisations surveyed and an invitation e-mail was sent to these individuals explaining what the research was about. The e-mail contained a hyperlink to the web page that hosted the questionnaire. Respondents clicked on the link and completed the questionnaire.

The interviews were recorded using a digital voice recorder and at the same time the researcher wrote notes on paper. The recordings were dated and labelled with the location and the people interviewed. A written record (transcript) of what had been said during the interview was made for the purpose of data analysis. This transcript was prepared as soon as possible, while it was still fresh in the mind.

4.13 DATA ANALYSIS METHODS

After data has been collected and before it is analysed, the researcher must examine the data to ensure the completeness and validity thereof (Hair *et al.*, 2007). Before the data analysis process, the collected data must be prepared. This was achieved by using standard editing and coding procedures. Data analysis usually involves reducing accumulated data to a manageable amount, developing summaries, looking for patterns and applying statistical techniques (Blumberg *et al.*, 2011). This was done in accordance with the objectives of the study.

e purpose of research is to discover answers to questions through the application of scientific procedures by explaining the relationship between variables (Kothari, 2009).

Sekaran (2009) defined a variable as anything that can take on differing or varying values at various times for the same object or person. This study sought to discover and explain the relationship between the independent and dependent variables defined next.

4.13.1 Independent variables

According to Weathington *et al.* (2012), an independent variable is a variable that is expected to cause or account for a change in the dependent variable. The independent variables in the study relating to information overload are as follows:

- Employee age, gender and race group
- Highest education level of the employee
- Employee position in the organisation
- The division in which the employee works
- Experience of the employee in terms of using computers
- Organisation size, location.

4.13.2 Dependent variables

Based on previous literature, information overload is caused by various factors such as the multiple sources of information (Edmunds & Morris, 2000), organisational and personal factors (Filippov & Oiastrebova, 2010), and overabundance of information (Hoq, 2016). Furthermore, previous research implies that information overload affects relationships (Ahuja, Chudoba, Kacmar, McKnight & George, 2007), influences decision making (Bettis-Outland, 2012), and worsens stress (Benselin & Ragsdell, 2016). The following dependent variables were explored in this study:

- Employee awareness of information overload
- Quality of information
- Preferred type of information

- Management awareness of information overload
- Effect of information overload on employees
- Experience in information overload
- Management of information overload.

4.13.3 Analysis of quantitative data

In this study, the data were analysed by means of exploratory data analysis. In exploratory data analysis, techniques are applied to data as part of a preliminary analysis or even a full analysis, if great statistical rigour is not required or the data do not justify it (Collis & Hussey, 2013). Blumberg *et al.* (2011) pointed out that exploratory data analysis is both a data analysis perspective and a set of techniques. The exploratory techniques used in this study were frequencies, central tendencies and measurement of dispersion. In addition to numerical summaries of location, spread and shape, exploratory data analysis uses visual displays to provide a complete and accurate impression of distributions and variable relationships (Blumberg *et al.*, 2011). This study tested the theories and concepts presented in the literature review chapter and statistically determined the causal relationship between the various independent and dependent variables. The study consequently aimed to establish whether information overload exists in South African shipping companies and if it is being formally managed.

There are three categories of statistical tests used for survey data analysis. They are descriptive statistics, parametric statistics and non-parametric statistics. Several statistical tests were employed for this study and are outlined in the ensuing sections.

4.13.3.1 Coding of quantitative data

Coding of collected quantitative data means assigning a number to a particular response so the answer can be entered into a database.

Closed-ended questions 1 to 36 were coded using numerical codes. All questionnaires were filled by the respondents online at QuestionPro. The questionnaires were coded online.

Moreover, since the data were collected on QuestionPro, it would already have been entered (input) and saved in a database. QuestionPro provides some statistical and reporting tools to report the survey results. Thus, the tools available from QuestionPro were initially used to analyse the data and a spreadsheet and SPSS were used to make refinements for the final presentation.

4.13.3.2 Descriptive statistics

Descriptive statistics were used to describe the basic features of the data for this study by reducing lots of data into a simpler summary. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data (Trochim, Donnelly & Arora, 2006). Tables, frequencies, central tendencies (mean, median and mode), and variability (standard deviation, variance, minimum and maximum) have been used to describe the collected data of this study.

4.13.3.3 Cronbach alpha

The internal consistency of the measures was tested using Cronbach's coefficient alpha. Cronbach's alpha is used to measure reliability of multipoint-scaled items (Sekaran, 2009). Cronbach's alpha is discussed in Chapter Five.

4.13.3.4 Pearson's chi-squared test

Pearson's chi-squared test is designed to describe a population of nominal data and is also referred as "goodness of fit". It is used to determine whether there is enough evidence to infer that two nominal variables are related and to infer that differences exist among two of more populations of nominal variables (Keller, 2006).

For the test of independence, also known as the test of homogeneity, a chi-squared probability of less than or equal to 0.05 ($p \leq 0.05$) corresponds to the variables having a relationship (Bowerman, O'Connell, Murphree, Huchendorf, Porter & Schur, 2014).

4.13.3.5 One-sample Kolmogorov-Smirnov test

The one-sample Kolmogorov-Smirnov test is used to decide if a sample comes from a population with a specific distribution (NIST/SEMATECH, 2012). In this study, the one-sample Kolmogorov-Smirnov test was used to determine whether the sample comes from a population which is normally distributed.

4.13.3.6 Factor analysis

Factor analysis is a commonly used data/variable reduction technique. This multivariate statistical technique is used to reduce the number of variables, establish underlying dimensions between measured variables and to provide construct validity evidence (Peri, 2012).

There are two common tests that are used to check how suited the samples are for factor analysis: Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test.

- **Kaiser-Meyer-Olkin (KMO) test**

The Kaiser-Meyer-Olkin (KMO) test measures the proportion of variance among variables that might be common variance. The lower the proportion, the more suited your data is to factor analysis. A KMO returns values between 0 and 1 with a value between 0.8 and 1 to indicate that the sample is adequate (Andele, 2016b).

- **Bartlett's test**

Bartlett's test is used to test if k samples have equal variances. Equal variances across samples is called homogeneity of variances. Some statistical tests, for example the analysis of variance, assume that variances are equal across groups or samples (NIST/SEMATECH, 2012). For factor analysis to be recommended suitable, the Bartlett's test of sphericity must be less than 0.05 (Peri, 2012).

In this study, the Kaiser-Meyer-Olkin and Bartlett tests were used to verify the samples' accuracy and adequacy.

4.13.3.7 Kruskal-Wallis test

The Kruskal-Wallis test is a rank-based non-parametric test that can be used to determine if there are statistically significant differences between two or more independent samples where the data are either ordinal or non-normal (Keller, 2006). This test was used to compare the mean rank scores between the two factors and the dependent variables.

4.13.3.8 Wilcoxon rank sum test

The Wilcoxon rank sum test is a non-parametric test used for comparing the means between two related samples, or repeated measurements on a single sample to assess whether their population mean ranks differ (Keller, 2006). Furthermore, the Wilcoxon rank sum test is limited to nominal variables with only two values (McDonald, 2014). Therefore, this test was applied to compare mean rank scores of the factors and the gender dependent variable.

4.13.3.9 Friedman test

Friedman's test is a non-parametric test for finding differences in groups across multiple attempts where the data are ordinal or interval and sometimes the data consist of only the ranks within each group (Keller, 2006; Andele, 2016a). Since Friedman's test only uses only the rank information of the data (Andele, 2016a), this test

The previous sections have outlined all the statistical tests that were employed to analyse the quantitative data collected. The next section describes the methods that were used to analyse the qualitative data.

4.13.4 Analysis of qualitative data

Getting qualitative data ready for analysis is a vital phase in the analysis process. There are a number of steps that should be followed before analysis can start which includes transcribing, coding and establishing themes.

4.13.4.1 Transcribing and coding of qualitative data

The kinds of data collected (field notes, video recordings and interviews, observations, etc.) tend to be very lengthy and require intensive examination, understanding and reading (Creswell *et al.*, 2016). Therefore, the approach to data analysis must be highly organised.

All the audio recordings from the interviews conducted for this study had to be transcribed. This was done verbatim. The recorded interviews were read several times after transcription had been done to make sure that nothing was missing.

Once the recordings had been transcribed and verified, the collected data needed to be coded. Coding is the process of reading carefully through the transcribed data and dividing it into meaningful analytical units (Creswell *et al.*, 2016). It basically means that while reading through the transcription, meaningful segments are marked with symbols, descriptive words or unique code names. Once the codes had been identified, the data collected were analysed to determine possible themes that emerged from the practitioners, for example common patterns around the sources of information, the individuals and departments most overloaded and ways of reducing information overload.

4.13.5 Analysis of mixed methods data

As specified, this study used a convergent mixed method design where both types of data were collected at the same time and about the same problem. Mixing or integrating of the two data types can occur at various stages in a research process: at data collection, at data-analysis or during the interpretation of the study results (Creswell *et al.*, 2016). After the quantitative and qualitative data had been analysed using the steps and statistical methods outlined in the previous section, the next step was to merge and then interpret the data. Mixing during interpretation involves comparing, contrasting and synthesising the different study results to show integrated conclusions (Creswell *et al.*, 2016). Findings from the literature review, quantitative stage and qualitative stage were integrated during the discussion of the outcomes of the study. In this study, data from the interviews can augment and explain complex or contradictory questionnaires responses. For example, a policy for managing information overload can be achieved by integrating management and individual perception of information overload.

4.14 PRESENTATION OF COLLECTED DATA

Data were organised according to meaningful categories of responses. Simple tabulation, cross tabulation and summarising the appropriate details of the responses were utilised to analyse the data. The collected data were statistically analysed and are presented in the next chapter, using descriptive statistics and inferential statistics. Factor analysis was used to summarise the number of variables into the seven objectives. The combination of these variables into the objectives simplified the analysis and understanding of the data.

Descriptive statistics is concerned with the presentation of the data using frequency and central tendency statistical techniques. In inferential statistics, Kruskal-Wallis, Wilcoxon rank sum, Friedman, Kaiser-Mayer-Olkin, Bartletts and Pearson correlation tests were used for the quantitative data analysis, as explained in Section 4.13.3.

4.15 ETHICAL CONSIDERATIONS

As Creswell (2013) pointed out, the researcher has an ethical obligation to protect their research participants, develop a trust with them, promote the integrity of research, guard against misconduct and impropriety that might reflect on their organisations or institutions; and cope with new, challenging problems. In compliance with the regulations of the University of KwaZulu Natal, the permission for conducting the research was first obtained from the Humanities and Social Sciences Ethics Committee of the University of KwaZulu Natal (Appendix D).

The application for research permission contained the description of the project and its significance, methods and procedures, participants, and research status. In addition, letters to the gatekeepers (Appendix A) were included together with the written consent from the decision makers of the companies.

The anonymity of participants completing the online questionnaire was protected as no names were asked. Likewise, while conducting the individual interviews with the selected respondents, company names and interviewees' names were replaced with codes or pseudonyms. Neither the participant names nor the names of their company were used in the published study.

4.16 SUMMARY OF CHAPTER FOUR

This chapter discussed the research methodology followed in conducting the study and described the research design, sample, and the data collection instruments. First of all the research problem was described and then stated. This was followed by the descriptions of the research question, the aim, objectives and approach of the study. The population of the study was expressed as the organisations in the shipping industry in the Durban area. The sample of the population from which data were collected consisted of 12 organisations with employees at varying managerial levels.

A mixed-method approach, using quantitative and qualitative aspects, was chosen for the study to provide comprehensive descriptions of the phenomenon of information overload in the shipping industry, and to establish guidelines for good practice for managing information overload. Two data sources were used in the study: semi-structured interviews and an online questionnaire. Interviews were used primarily to seek answers to the main research questions; the quantitative data obtained from the questionnaire were used to seek answers to the research sub-questions. And finally, the procedures and techniques for analysis were specified with respect to the construct to be measured.

Chapter Five presents the analysis of the data obtained from the questionnaires completed and Chapter Six presents the analysis of the data obtained from the interviews transcriptions.

CHAPTER FIVE

DATA ANALYSIS AND RESULTS OF THE QUANTITATIVE RESEARCH

5.1 INTRODUCTION

Chapter Four outlined the approach to data collection for this study. The design (approach and framework) and methodology (execution) used were described in detail in the chapter. The data that were collected from the responses to the questionnaire and analysed are presented in this chapter in the form of descriptive and inferential statistics. Information collected via interviews with the owners, managing directors and decision makers of the 12 surveyed shipping companies is presented in Chapter Six.

The data collected via the questionnaire were grounded largely on the personal views of the participants across all levels of management and non-management. The information that emerged from the data provided the researcher with the basis to articulate a theory regarding the effective management of information overload within shipping companies in South Africa.

This chapter is organised in three sections. The first section summarises the statistical methods employed and describes the composition of the sample. The second section presents the collected data in terms of frequencies, percentages, charts and descriptive statistics of the items of the survey questionnaire. Section three deals with correlations and factor analysis.

The sample sizes for tables and figures are not indicated if n=421. However, if it differs, this will be clearly indicated.

5.2 STATISTICAL METHODS EMPLOYED

Analysis of the survey data was undertaken using SPSS version 22.0 (SPSS Inc., Chicago, Illinois, USA). There are three categories of statistical tests used for survey data analysis. They are descriptive statistics, parametric statistics and non-parametric statistics.

Several statistical tests were employed throughout the analysis and are outlined below.

5.2.1 Data coding

Due to the different number of items per scale, the scores were transformed into a mean grade (1 to 5) so that the results on different scales were easily comparable. The measurement scale code that was used in the statistical analysis are interpreted as 1 being “Not Applicable”, 2 is “Strongly Disagree”, 3 is “Disagree”, 4 is “Agree” and 5 is “Strongly Agree”. The responses of “Not Applicable” were treated as missing variables and were not included in the central tendency statistics. Therefore, the Likert scale questions (Q20, Q22-Q24, Q27-Q31) were recoded so that they matched the coding scheme described above. Question 21 is a negative question and the coding was unchanged. Furthermore, the Likert type questions were combined into agreement (Strongly Agree and Agree) and disagreement (Strongly Disagree and Disagree) as it made for easier understanding of the respondents’ sentiments. In addition, the label corresponding to the combined agreement is “Agree” and likewise, the label for the combined disagreement is “Disagree”. Detailed data are available on the attached DVD.

All the statistical tests that were employed to analyse the quantitative data have been outlined. The next section addresses the reliability of the questionnaire.

5.3 RELIABILITY ANALYSIS

It is useful to measure the reliability of a new instrument in order that interpretations based on current and future use of the instrument can be made with a degree of confidence. The reliability estimate is an indicator of the instrument's stability and for this study was measured using the Cronbach's alpha. Cronbach's alpha is expressed as a correlation coefficient, ranging in value from 0 to +1. The closer Cronbach's alpha is to 1, the higher the reliability of the instrument (Sekaran, 2009).

The questionnaire consisted of 36 questions. Of the 36 questions, five items were used to measure the quality of electronic information and five items to measure the effect of excessive electronic information. This measure required respondents to indicate on a five-point Likert scale, the extent to which they agreed or disagreed with the statements.

Table 5.1: Instrument reliability

Variables	No of items	Cronbach's alpha
Quality of electronic information	5	0.7
Effect of excessive electronic information	5	0.8
Overall	**10**	**0.8**

Cronbach's alpha for the five questions, measuring the quality of electronic information, is 0.7 which indicates a high degree of internal consistency amongst these items (Table 5.1). Similarly, Cronbach's alpha for the questions measuring the effect of excessive information is 0.8 with the overall Cronbach's alpha for the 10 items at 0.8. This overall alpha value (0.8) is greater than 0.7, as per Bryman and Cramer (2006), indicating that the components forming the factors to measure the quality of effective electronic information and the effect of excessive electronic information have adequate internal consistency and reliability. Therefore, the results shown in Table 5.1 confirm that the instrument used in this study was reliable with a Cronbach's score of 0.8.

5.4 COMPOSITION OF SAMPLE

Table 5.2 shows the size and composition of the samples for each company. The samples were stratified according to the scale of the organisation's operation (small, medium and large) and type of the organisation (national or international).

Table 5.2: Composition of the sample

Company	Size	National/ International	Branches in SA	Population	Required sample	No of respondents
A	Small	National	1	20	19	20
B	Small	International	2	18	17	17
C	Small	National	2	18	18	18
D	Small	National	2	17	17	17
E	Small	National	3	14	14	14
F	Medium	International	3	21	20	20
G	Medium	National	1	24	23	23
H	Medium	National	2	23	22	22
I	Medium	International	3	46	42	42
J	Medium	International	3	37	34	34
K	Large	International	4	150	97	112
L	Large	International	3	103	73	82
Total				**491**	**396**	**421**

Of the 491 questionnaires distributed via e-mail and company intranet to managers and non-managers, 453 responded, giving a response rate of 92%. Of the 453 respondents who started the survey only 421 completed it. Thus, the completion rate was 86%. The average time taken to complete the survey was 14 minutes.

When presenting the surveyed data, the sample sizes for tables and figures are not indicated if it is 421. Conversely, if it differs from 421, this will be clearly indicated.

For the purpose of descriptive statistics, all results were rounded to the nearest whole number to make the presentation clearer and to have the principles emanating from the results easier to understand. A p-value less than 0.05 ($p<0.05$) was considered statistically significant.

5.5 DEMOGRAPHIC PROFILE OF RESPONDENTS

The questionnaire elicited the following biographical details from respondents: age, gender, race group, education level, department, managerial level, experience and computer knowledge. Based on previous literature, it was deemed necessary to establish if these characteristics could be related to, and whether they influenced respondents' perceptions of information overload.

Table 5.3: Demographic profile of the respondents

Demographics	n=421
1. Age	
20-29	20
30-39	35
40-49	30
50-59	11
60 years and over	4
Total	**100%**
2. Gender	
Male	55
Female	45
Total	**100%**
3. Race	
Indian	51
Black	20
White	18
Coloured	11
Total	**100%**
4. Highest level of education	
High School	33
Post Matric Diploma	32
University Degree	15
Post Graduate Diploma/Honours Degree	12
Master's Degree	7
PhD/Doctorate	2
Total	**100%**
5. Position in the organisation	
Non-management	48
Supervisor	11
Junior Manager	7
Middle Manager	16
Senior Manager	18
Total	**100%**
6. Department	
Operations	26
Marketing	17
Accounting/Finance	15
Administration	15
Customer services	12
IT	7
Human resource management	4
Production	2
Other	2
Total	**100%**
7. Years of experience using computers and computer programs	
Less than 1 year	2
1 to 5 years	14
6 to 10 years	18
11 to 15 years	14
Over 15 years	52
Total	**100%**
8. Competence using computer technology	
Novice user	3
Competent user	41
Proficient user	42
Expert user	14
Total	**100%**

Table 5.3 reveals that the majority of the respondents were male (55%) compared to female (45%). The dominance of males in the sector is closely linked with the South African Department of Transport statistics which shows that 52% of the shipping workforce are male and 48% are females (Department of Transport of South Africa, 2015).

In terms of age, the respondents were grouped into five categories.

Table 5.3 also shows the age group dispersion of the participating respondents, with the age group of 60 and over being the least represented group at 4%. This is in accordance with the South African workforce demographics where 60 is normally the retirement age (du Toit, 2015). The age group with the highest representation was the group 30-39 at 35%. The majority of the respondents (65%) were between the ages of 30 to 49.

Indian respondents comprised the largest group of the respondents at 51%. Black respondents were the second largest group at 20% followed by Whites and Coloured at 18% and 11% respectively. The population distribution of KwaZulu-Natal was Black (86.9%), Indian (7.5%), White (4.0%), and Coloured (1.3%) (Statistics South Africa, 2012). The racial demographics in the sector did not match the provincial demographics as Blacks were the group least represented. This is expected due to the fact that Blacks were historically disadvantaged (Anderson, Case & Lam, 2001; Southall, 2004).

The education profile presented in Table 5.3 suggests that there is a relatively balanced level of education amongst the respondents, with 33% having high school education, 32% with a post matric qualification and 35% (=15+12+7+1) holding university qualifications.

The respondents were grouped into five categories according to their rank at work and grouped into nine groups according to the department they were employed in. The majority of the respondents (48%) were non-management staff followed by senior management (18%), middle management (16%), supervisors (11%) and junior managers (7%). Furthermore, Table 5.3 indicates that opinions expressed by respondents covered all the major departments of shipping companies. The operations department was most significantly represented (26%). This was followed by the marketing department (17%). The accounting/finance (15%) and administration (15%) departments were both also significantly represented.

The survey results reveal the dispersion of the current managerial experience of the participating respondents. In this study, 84% had six years or more experience in using computers and computer software. Because of the increasing availability of computers, it was expected that respondents would be more comfortable and competent using technology such as computers, e-mail and the Internet. Almost all respondents (97%) considered themselves to be competent and better at using a computer for their work, with only 3% who felt they were novices.

5.5.1 Demographics of respondents by organisation size and type

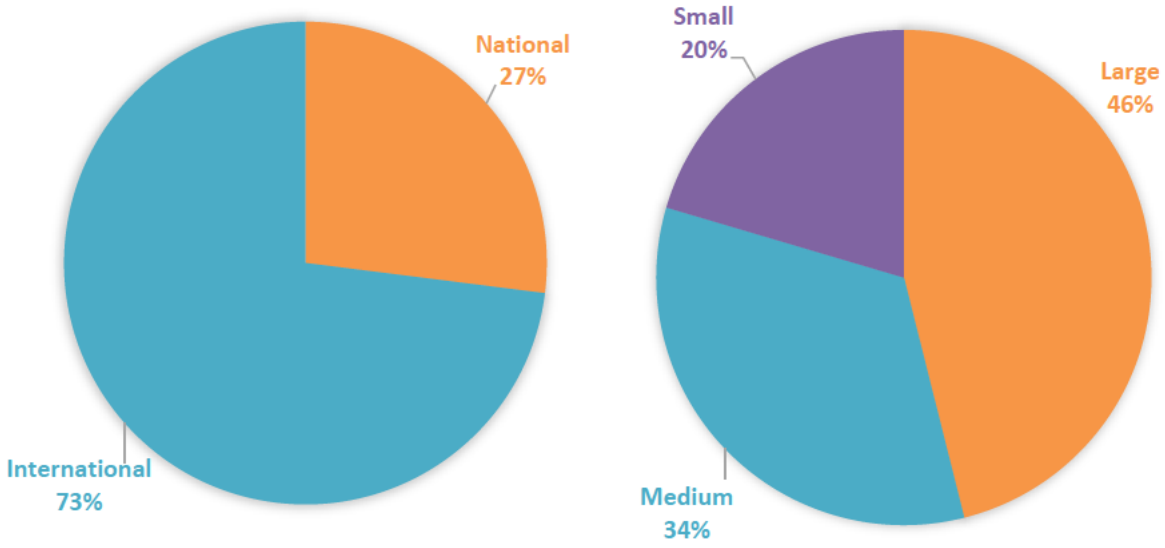

Figure 5.1: Respondents by organisation (n=421)

Figure 5.1 summarises the data on employees by organisation. The 421 respondents were a diverse group with respondents working for large organisations making up 46%, and respondents working for medium and small organisations were 34% and 20% respectively. The majority (73%) of the respondents worked for international companies.

5.6 DESCRIPTIVE ANALYSIS OF THE INDEPENDENT VARIABLES

As demographic data from respondents were illustrated previously in Table 5.3, this section provides information for describing the independent variables grouped under the four

quantitative objectives defined in Chapter Four. Subsequently, each objective is used as the heading for the section in which corresponding tables and interpretation of results are included for examination.

5.6.1 Objective 1: To determine whether employees are aware of information overload

To determine the awareness of information overload, Questions 9, 10, 11, 15, 33, 34, 35 and 37 (Appendix B) were asked.

5.6.1.1 Respondents' understanding of information overload

Question 9 related to the respondents' perception and definition of information overload (**Figure 5.2**).

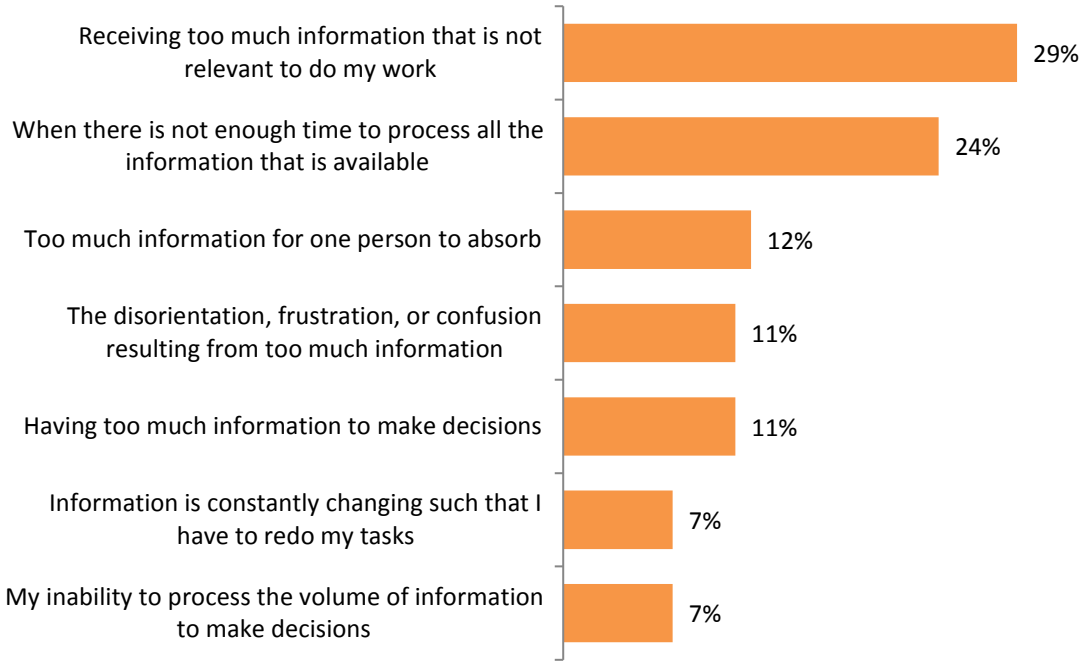

Figure 5.2: Respondents' understanding of the term information overload (n=421)

Almost one third (29%) of the respondents indicated that they believe that information overload occurs when there is too much irrelevant information, and 24% stated that information overload occurs when there is not enough time to process all available information. This is in line with Ruff (2002) who found that 72% of managers in the UK feel

that too much information sent to them is wasting their time, and van Knippenberg *et al.* (2015) who found that employees spent less than 50% of their time on the tasks for which they were hired. Furthermore, Benselin and Ragsdell (2016) reported 11% of their respondents believed that information overload is "having trouble processing available information".

The problem statement of this study suggested that information overload occurs when the amount of information received is greater than what can be processed. From the literature review, it became clear that information overload has been defined as the limited human information-processing capacity and overabundance of irrelevant information. Therefore, results from this study confirm this definition with the top three responses totalling 65%: there is too much irrelevant information (29%), there is not enough time to process all available information (24%), and there is too much information for one person to absorb (12%).

5.6.1.2 Respondents' feelings of information overload

The majority of respondents (59%) felt they were overloaded with information (Figure 5.3).

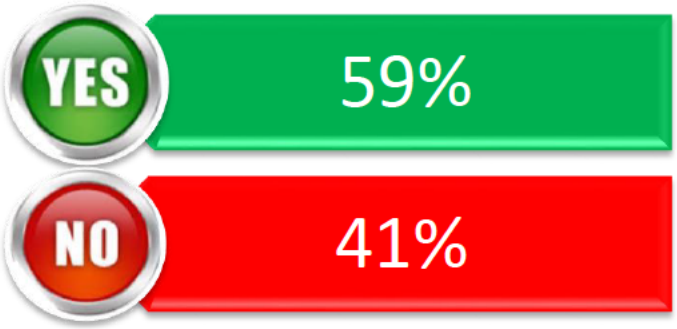

Figure 5.3: Are you overloaded with information (n=421)?

Almost two thirds (59%) of the respondents indicated that they are overloaded with information. This is significantly different from the legal profession where 80% of respondents reported being overloaded with information (MacDonald *et al.*, 2011). Likewise, Clarke and O'Brien (2012) reported that 80% of US government workers suffered from information overload.

5.6.1.3 Length of time respondents feel overloaded with information

The 248 respondents who said that they feel overloaded with information were asked about the length of time they experience information overload (Figure 5.4).

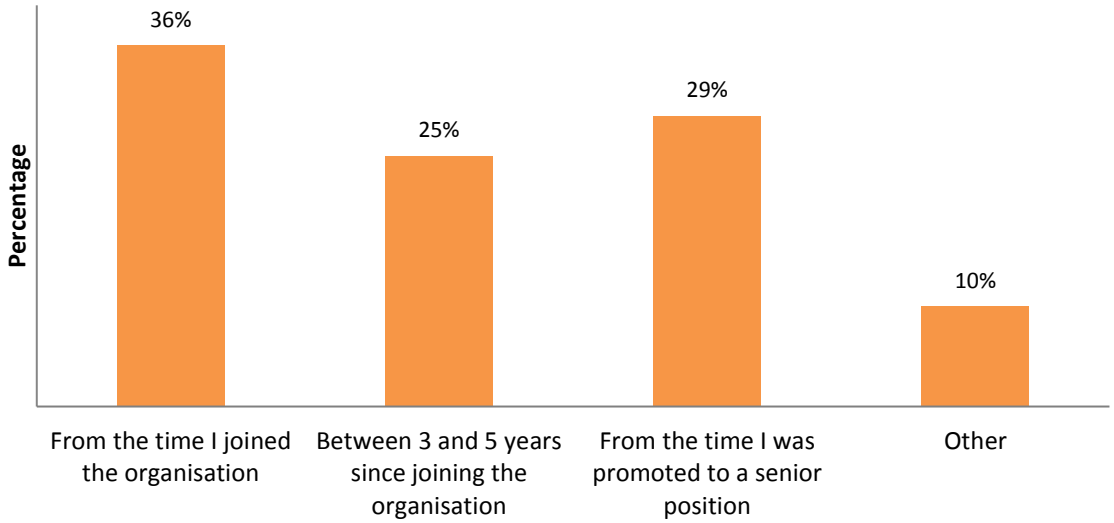

Figure 5.4: Information overload timeline (n=248)

Figure 5.4 shows that 36% of the respondents started feeling the effects of information overload from the time they joined the organisation, followed by 29% who have been overloaded after being promoted. The results support prior findings where newcomers perceived a higher information need than long time employees, because they had to learn about the requirements of their job and the expectations associated with their role and thus were more affected by information overload (de Bakker, 2007). A quarter of the respondents experienced information overload early in their careers (between 3 and 5 years).

Furthermore, 10% mentioned being overloaded because: they were transferred to a new department or division and some felt that were overloaded from well over 5 years before.

5.6.1.4 Recurrence of information overload

The 248 respondents who are overloaded with information were asked how often they experience the problem (Figure 5.5).

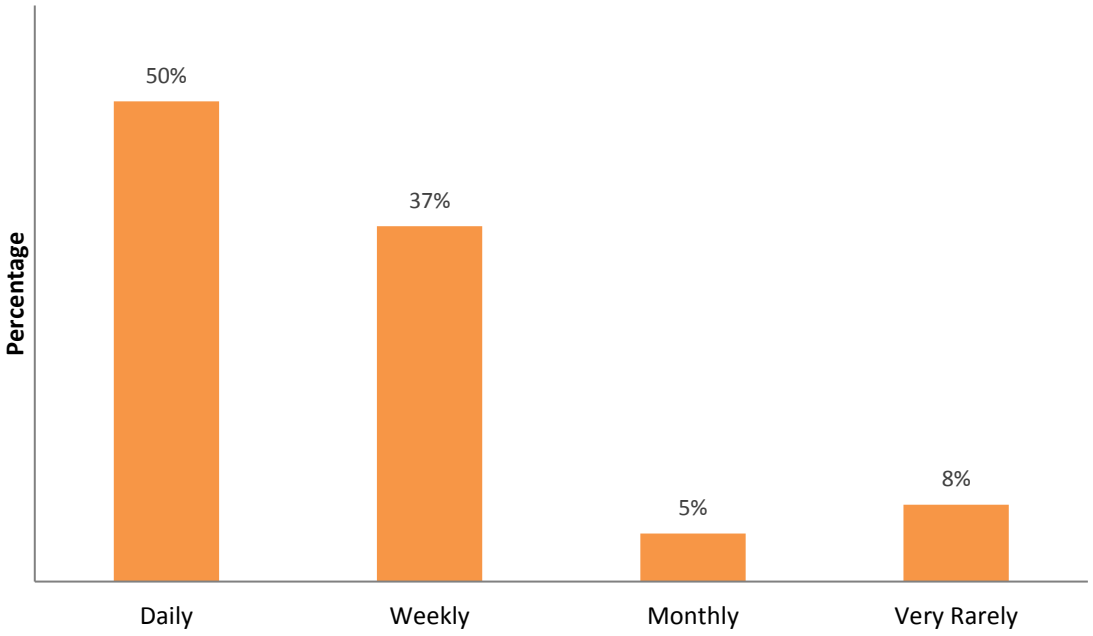

Figure 5.5: Frequency encountering information overload (n=248)

It is evident from Figure 5.5 that most of the respondents stated they are overloaded with information overload daily (50%) followed by weekly (37%). Combining daily and weekly overload (87%) suggests that respondents were often overloaded with information, which is similar to the findings of Holton and Chyi (2012) that 73% of the respondents were often overloaded with information. An earlier study reported that 64% of the respondents encountered information overload regularly (Farhoomand & Drury, 2002). There figures show an upward trend in the frequency of information overload, suggesting an increasing organisational problem.

5.6.1.5 Reducing information overload in the organisation

Figure 5.6 shows the feelings of the respondents regarding who should be responsible for managing information overload.

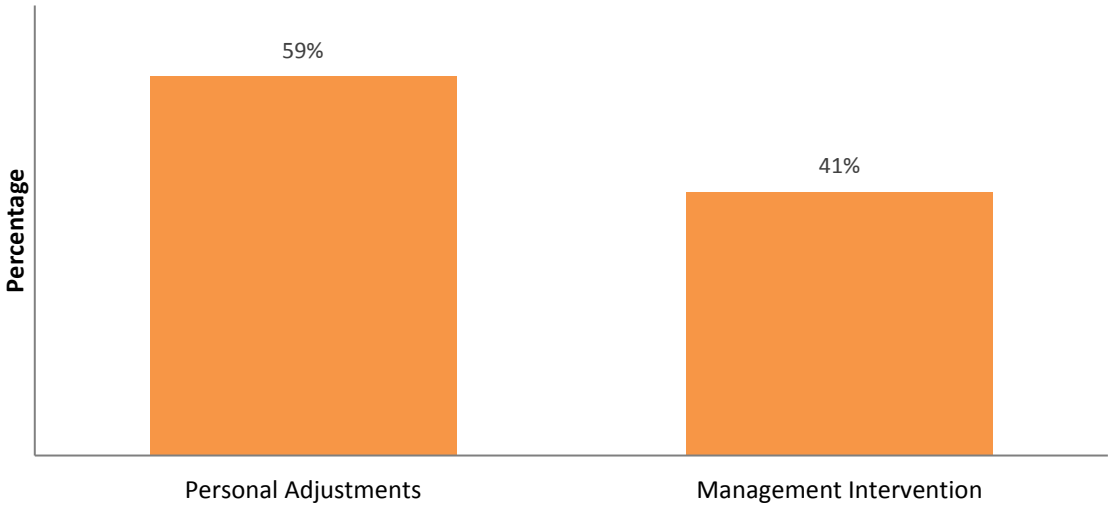

Figure 5.6: Ways to minimise information overload (n=421)

Most of the respondents (59%) stated that they believe that adjusting their own practices could help in reducing information overload. This confirms the study of Whelan and Teigland (2013) who suggested that information literacy skills (i.e. the ability to analyse, evaluate, and handle information) are important for managing information overload.

Forty-one percent suggested management intervention is the way to manage information overload. This seems to be a general consensus amongst businesses. For example, organisations are implementing sophisticated information and communication systems to capture employees' expertise and experience and facilitate knowledge sharing across their operations, and tighten their connections to external sources of insight and innovation (van Knippenberg *et al.*, 2015).

Although managing management intervention and adjusting own practices are mentioned in the literature as ways to minimise information overload, no studies have indicated which one is the preferred method.

5.6.1.6 How can management assist to minimise information overload?

Respondents who opted for management intervention to reduce information overload were further asked to identify what management should do to help (Figure 5.7).

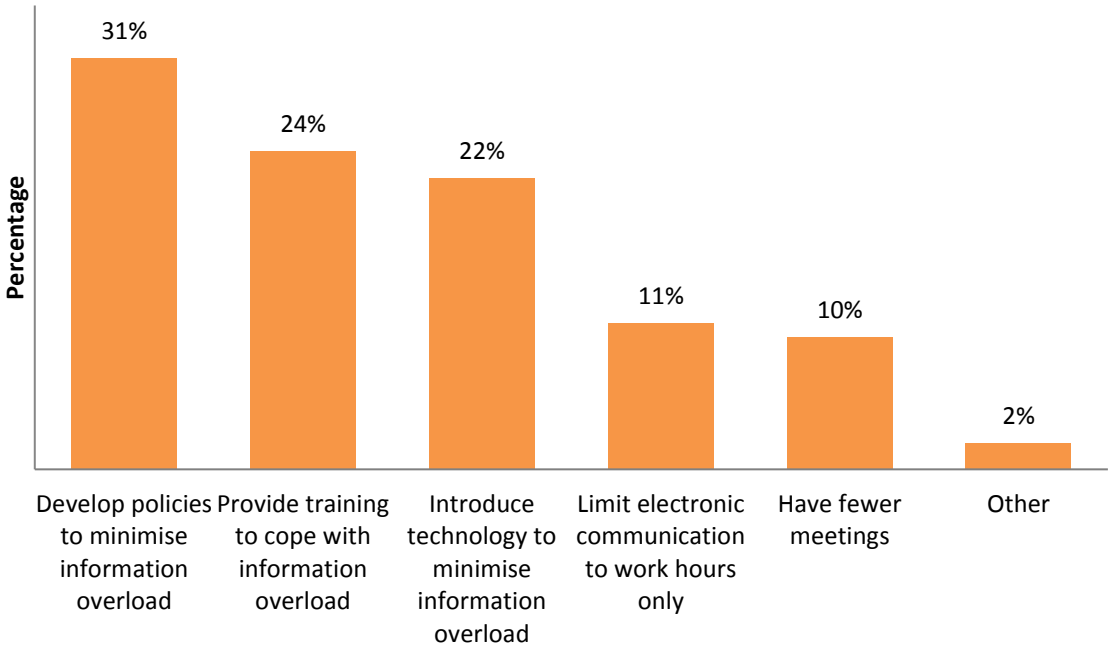

Figure 5.7: Management actions for reducing information overload (n=172)

The distribution in Figure 5.7 tends towards policy development to help minimise information overload (31%). There is also a high demand for training (24%) and introduction of technology (22%) to minimise information overload.

5.6.1.7 How can an individual manage information overload?

Figure 5.8 describes how respondents believe they can personally manage information overload.

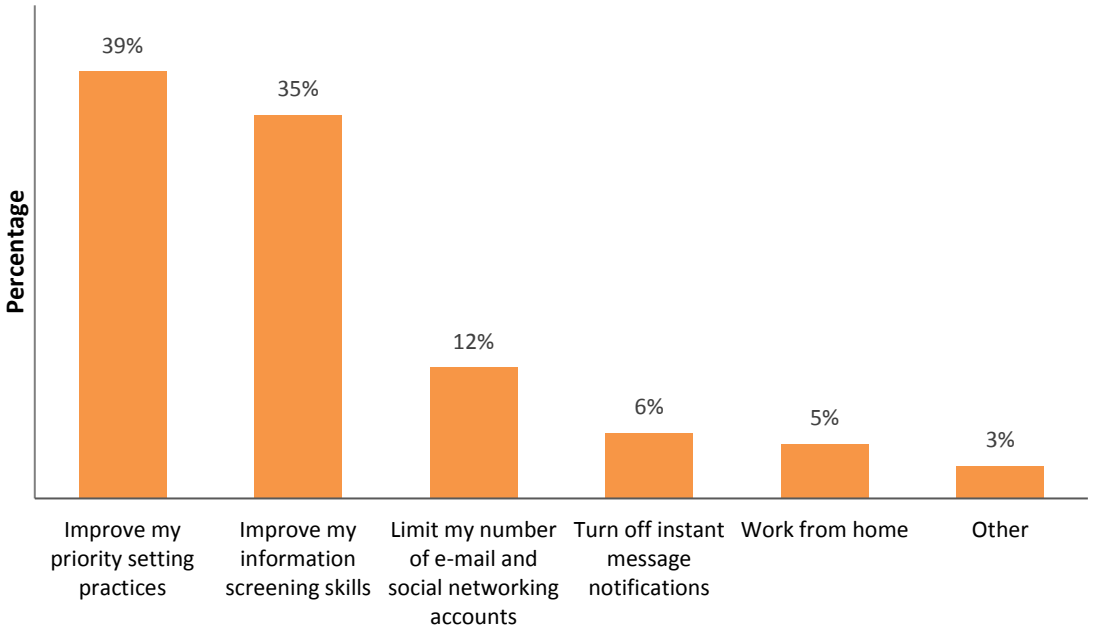

Figure 5.8: Personal adjustment for reducing information overload (n=250)

Thirty-nine percent of the respondents indicated they believe that information overload can be reduced by improving priority settings and 35% indicated that improving information screening skills will reduce information overload. Figure 5.8 also shows that limiting the number of e-mail and social networking accounts (12%) and turning off instant message notifications (6%) only accounted for a total of 17% of the respondents.

5.6.1.8 Additional comments regarding information overload

The terms in Figure 5.9 are drawn from the open-ended Question 37 featured at the end of the questionnaire. Thirty-five respondents had additional comments regarding information overload.

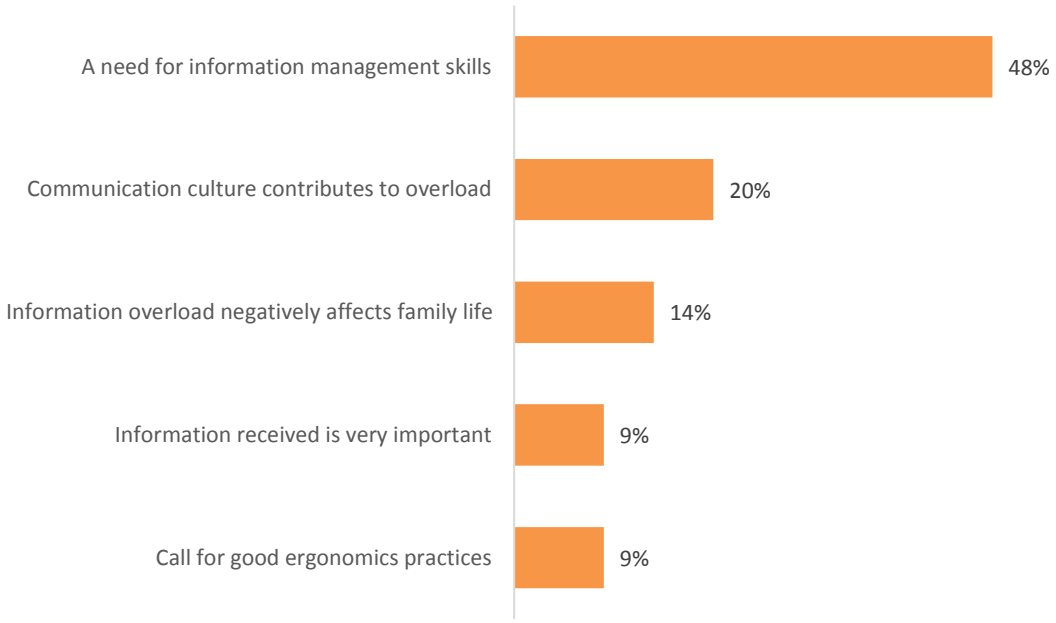

Figure 5.9: Additional comments on information overload (n=35)

- **A need for information management skills**

The most common comment made was that employees required information management skills. Almost half of the respondents who had additional comments asked management to provide training opportunities on handling information. For example,

> *"I would like to improve my information skills in the workplace with studies. For example, e-mail management".*
>
> *"Management should help to improve my information skills in the workplace and this can be used for my studies also".*

Information management skills should be availed to employees at all levels including management as no-one is spared from information overload. According to one respondent,

> *"Many people do not actually know to identify what they actually need, even those in management".*

- **Communication culture contributes to information overload**

Twenty percent of the respondents mentioned that the communication culture in their organisation contributes to information overload in the following ways:

- People get copied in e-mails that are irrelevant to their line of work. This happens due to a variety of reasons. According to one respondent:

  "It's not the issue with so much communication; it's the matter of being copied on e-mails that are just for an information purpose, a 'just in case you need to know this'. These don't serve much benefit. Sometimes the same subject matter can do the 'rounds' on e-mail by which a face to face meeting with a direct answer/decision is the most efficient way of dealing with the subject at hand".

- Too many communication channels that are continuously supplying employees with data and e-mails. It is important to look into better information sharing frameworks. One respondent proposed the following:

  "Install better centralised communication systems. Try to have only one means of communication from external parties e.g. Only e-mails, call logging systems".

- Too much reliance on electronic communication even in instances where it is necessary to meet face to face. One respondent explained that it is important to assess the channel of communication based on the message to be communicated; one should determine whether it is necessary to communicate electronically or to just walk to the person and have a face-to-face discussion.

- Two of the respondents believed that working smarter and team work can help in reducing information overload.

▪ **The impact of information overload on family time**

Out of the 35 comments given, 14% highlighted family time being affected because information comes directly to cell phones Employees thus find themselves having to deal with work-related issues even during times when they are supposed to be relaxing and taking a break from work. For example, one of the respondents said:

"The fact that I have access to my mails on my phone has an effect on my family because I tend to be checking my phone constantly for mails that may or may not require my attention. Because I receive so many mails, I feel that it's better to check them constantly. However, this does affect the quality of the time that I spend with my family".

The recommendation given was that there should be a way to ensure that work information is dealt with or received during working hours only.

- **Call for good office ergonomics practices**

There were calls for cell phones with bigger screens for those who need to access documents outside the office and on their cell phones. Strain on the eyes was a problem which was mentioned by one respondent. There was a request for computer cover screens and screen filters to protect the eyes. One of the respondents said:

> *"I work on the ship and read a lot of documents on my smartphone. The screen is too small. It would be better to have a tablet. The tablet should not be very big also".*

- **Information received is very important for the work**

Three of the respondents stated that even though there is a lot of information, the nature of their work required the information in order to keep updated. For example, one of the respondents said:

> *"In the organisation, I worked, there are constant e-mails and notifications about what's going on in the environment. This is because there are multiple systems that are being used by the customer, and changes to these systems need to be known as they could impact your area. Therefore, keeping up to date and reading 99% of communications is important in my industry".*

5.6.2 Objective 2: To identify what the sources of information overload are

In order to identify the sources of information overload, Questions 12 to 21, 23 and 24 were included for the respondents to answer.

5.6.2.1 *Reasons for feeling overloaded with information*

Friedman's test was applied to Question 12 to determine whether there are differences between the reasons for feeling overloaded (Table 5.4).

Table 5.4: Reasons for feeling overloaded

Rank	Reasons	Mean
1	Too many electronic messages	2.02
2	Too many phone calls	3.15
3	Too many reports to read and/or prepare	3.65
4	Too many office interruptions	3.77
5	Too much business-related news	4.20
6	Too many meetings	4.22

It is apparent from Table 5.4 that the main reason for feeling overloaded was that respondents receive too many electronic messages. This was followed by too many phone calls and too many reports to read or prepare. The findings of this study confirm previous studies which cited the sheer quantity of e-mails received as one of the main causes of information overload (Whittaker & Sidner, 1996; Edmunds & Morris, 2000).

5.6.2.2 *Effect of modern technology on level of information overload*

Over 91% of the study's respondents reported that modern technology had increased their level of information overload (Figure 5.10).

Figure 5.10: Has your level of information overload increased with modern technology? (n=248)

It is evident that modern technology has increased the level of information – out of the 248 of respondents who said they are overloaded with information, 92% suggested that modern technology is a contribution to information overload. This result supports the previous finding where respondents ranked "too many electronic messages" as the main reason why they felt overloaded (Edmunds & Morris, 2000; Hoq, 2016).

5.6.2.3 Electronic sources of information that has increased work-related information

Question 14 asked the respondents to rank five sources of information that has increased the amount of information they receive for work (Table 5.5).

Table 5.5: Electronic sources of information that has increased work-related information

Rank	Electronic sources of information	Mean
1	E-mail	1.74
2	Mobile phones	2.35
3	Instant messages	3.19
4	Social networks	3.70
5	Teleconferencing	4.02

E-mail was pointed out as the main source of information overload which is similar to studies by Farhoomand and Drury (2002) and Gallo (2012). Cell phones were indicated as the second source of information overload. However, it is debatable whether the third and fourth variables (instant messages and social networks) had anything at all to do with work.

5.6.2.4 Information preference

Respondents were asked what and why they prefer certain types of information (Figure 5.11).

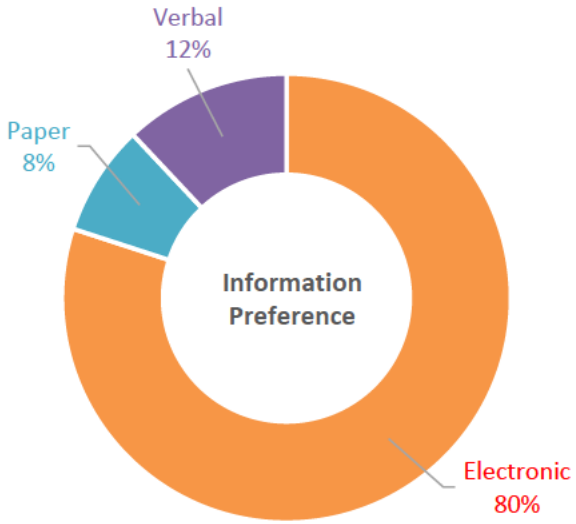

Figure 5.11: Preferred type information (n=421)

Electronic information was indicated as the preferred means of communication amongst the respondents (80%), compared to written/printed (8%) and verbal (12%). The findings of Laclavik and Maynard (2009) also showed that 80% of their respondents preferred electronic messages for business communication. Similarly, Welch (2012) reported that print communication seems to be losing preference to electronic forms of communication.

The reasons for favouring each type of communication are illustrated in Figure 5.12, Figure 5.14 and Figure 5.15.

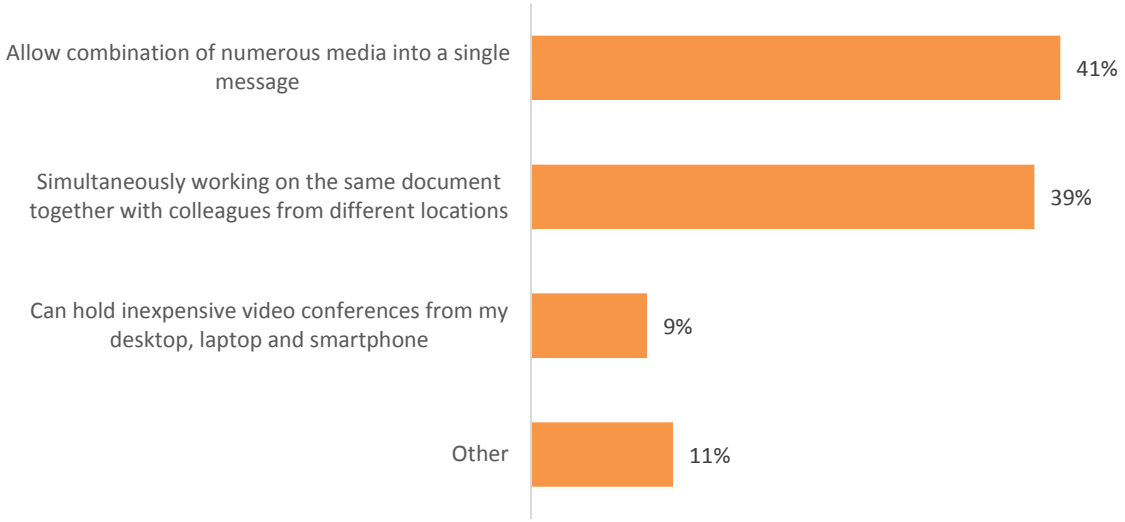

Figure 5.12: Preference for electronic communication (n=336)

Forty-one percent of respondents indicated that they prefer electronic communication because it allows combinations of different types of media in a single message. This was followed by 39% who chose electronic messages as it allows multiple colleagues from various locations to work on the same document.

While it is evident that electronic information was the preferred means of communication, it is worthy to note that 11% of the respondents who preferred electronic communication had other reasons. The terms in **Figure 5.13** are drawn from the text box “other” of that question.

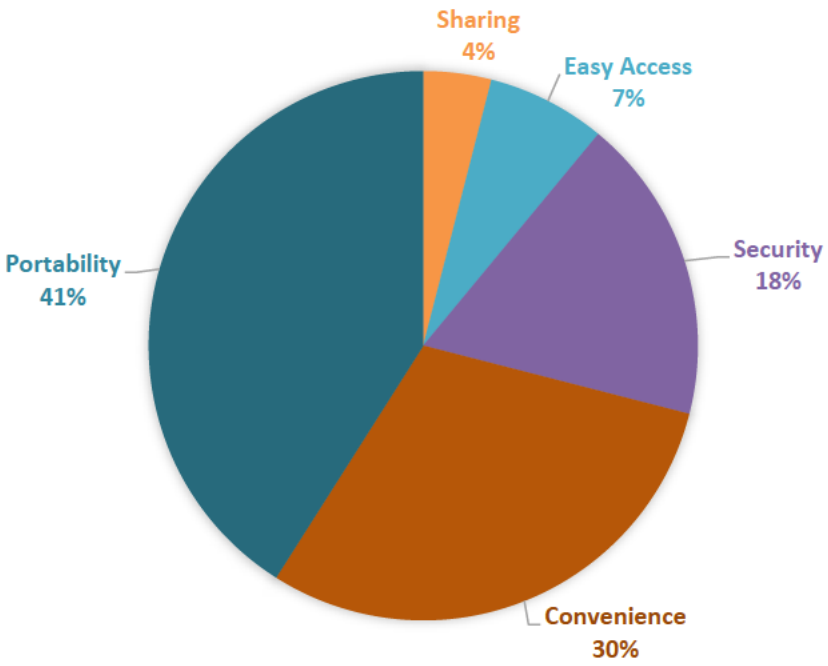

Figure 5.13: Other reasons for preferring electronic information (n=37)

Figure 5.13 shows that portability (41%) and convenience (30%) were the two most cited reasons for preferring electronic information.

The feedback from respondents regarding their choice of verbal communication is illustrated in Figure 5.14.

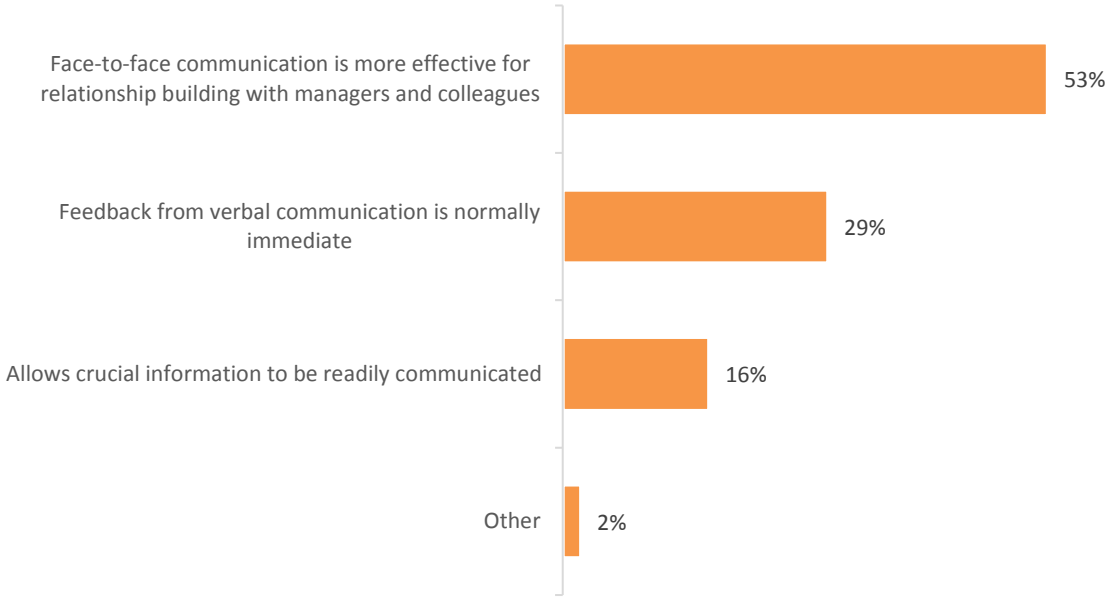

Figure 5.14: Preference for verbal communication (n=49)

The main reason for favouring verbal communication was because face-to-face communication was considered to be more effective for relationship building with managers and colleagues (53%). This is in line with Welch (2012), who suggested that face-to-face helps in establishing a sense of community in an organisation. Immediate feedback from verbal communication was second with 29%.

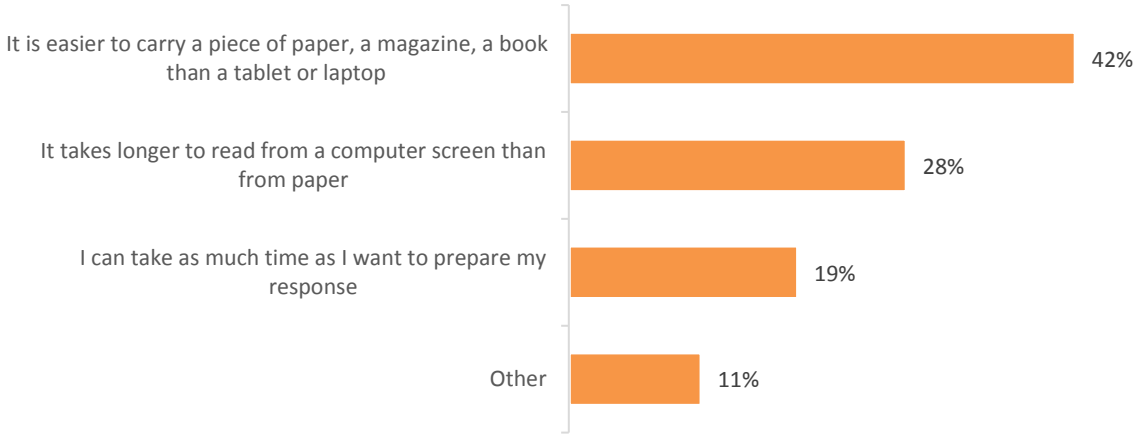

Figure 5.15: Preference for written/printed communication (n=36)

Respondents who said they prefer paper communication indicated that it is easier to carry a piece of paper compared to a laptop or tablet (42%). This finding matches Welch (2012), who found that respondents preferred paper communication because a paper copy allows them read in comfort. And 28% found it easier to read from paper than a computer screen.

5.6.2.5 The type, quality and timeliness of information I receive at work

Questions 20 to -24 required information from respondents about the effect of the quality of information that they receive at work (Table 5.6).

Table 5.6: Type, quality and timeliness of information received at work (n=421)

Questions	Disagree	Agree	N/A	Total
The type of electronic information I receive at work is hard to understand	83	16	0	100%
The quality of electronic information I receive at work is clear and concise for me to do my work	23	77	0	100%
The quality of electronic information I receive at work is not relevant for me to do my work	66	33	1	100%
The electronic information I require to do my work is not available timeously enough	60	39	1	100%
I feel that the quality of electronic information I receive at work has a negative impact on my work performance	43	56	1	100%

When Table 5.6 is analysed, it is possible to state that the information respondents receive at work is not hard to understand (83%). Similarly, 77% agreed that the information they receive at work is clear and concise for their work. Furthermore, 66% of the respondents suggested that the quality of information they receive is relevant for doing their work. Sixty percent of the respondents stated that information is available on time for doing their work. It is interesting to note that 56% of the respondents said they feel that the quality of information has a negative impact on their job performance.

This aligns with Hargittai, Neuman and Curry (2012) who found that quality of information has a worse effect than excessive quantity of information. The findings of this study also agree with Benselin and Ragsdell (2016) who found that quality of information is becoming a big issue especially among younger workers.

5.6.3 Objective 3: To assess the effect of information overload on employees

Question 25 through to Question 32 focused on the effects of information overload on employees as understood by the respondents.

5.6.3.1 Finding a document in my possession

Question 25 asked the respondents to identify how they normally find documents already in their possession (Figure 5.16).

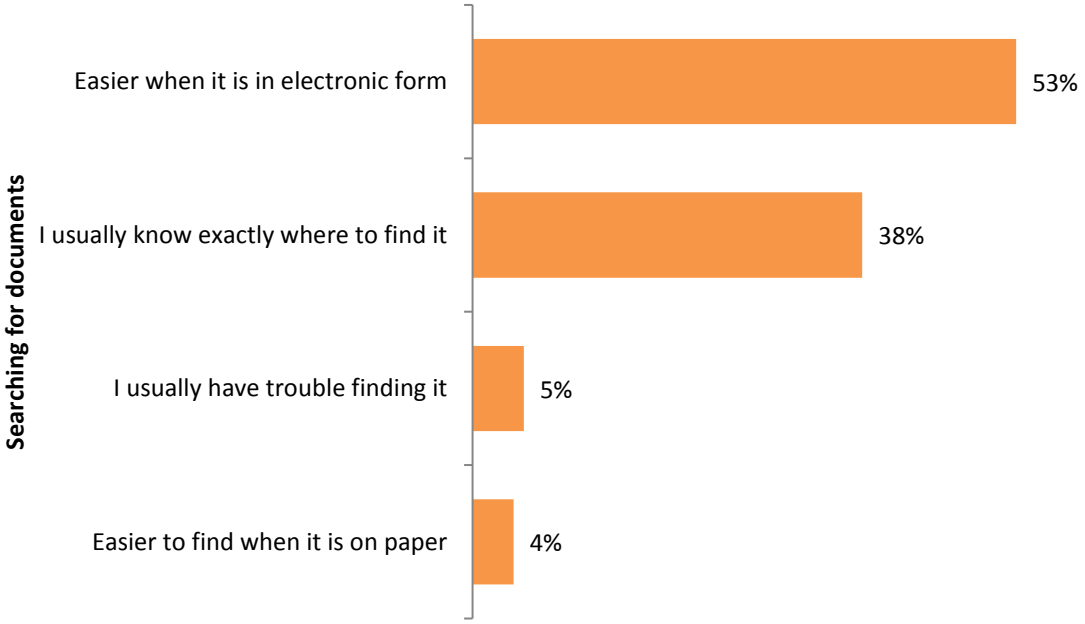

Figure 5.16: Finding a document in my possession (n=421)

A little more than half of the respondents (53%) indicated that they find it easier to locate a document when it is in electronic format. This may be due to the fact that searching electronic documents is easier as they carry increasing amounts of searchable metadata in addition to document content (Jones, 2004). Thirty-eight percent of the respondents said they have no problem finding the required document, irrespective of how it is stored. Only 4% of the respondents suggested that it is easier to find a document when it is in paper format. It is important to note that 5% of respondents said they have problem finding documents already in their possession.

5.6.3.2 *Impact of excessive information on my work performance, physical well-being and relationships with colleagues, family and friends*

Respondents were asked what effects the electronic information they received at work had on their work performance, health and relationships with family, friends and colleagues (Questions 27-31). The results of the five Likert scale questions about the effects of the excessive information are listed in Table 5.7.

Table 5.7: Effects of excessive information (n=421)

The excessive amount of electronic information I receive at work:	Agree	Disagree	N/A	Total
Negatively affects my work performance	48	51	1	100%
Negatively affects my physical well-being	38	60	2	100%
Negatively affects my relationship with my family	31	68	1	100%
Negatively affects my relationships with colleagues	27	71	2	100%
Negatively affects my relationship with my friends	21	78	1	100%

In terms of relationships, information overload negatively affects family (31%), colleagues (27%) and friends (21%). Burger and Rensleigh (2007) also reported that the elements causing information overload inevitably influenced relationships with colleagues and with friends and family.

It is a point of concern for management that information overloaded affects health (38%), as it can have an impact on work attendance. Furthermore, it is a more alarming that it affects work performance (48%).

5.6.3.3 *Health effects of information overload*

In Question 32, respondents were asked to choose three factors that affect their well-being (Figure 5.17).

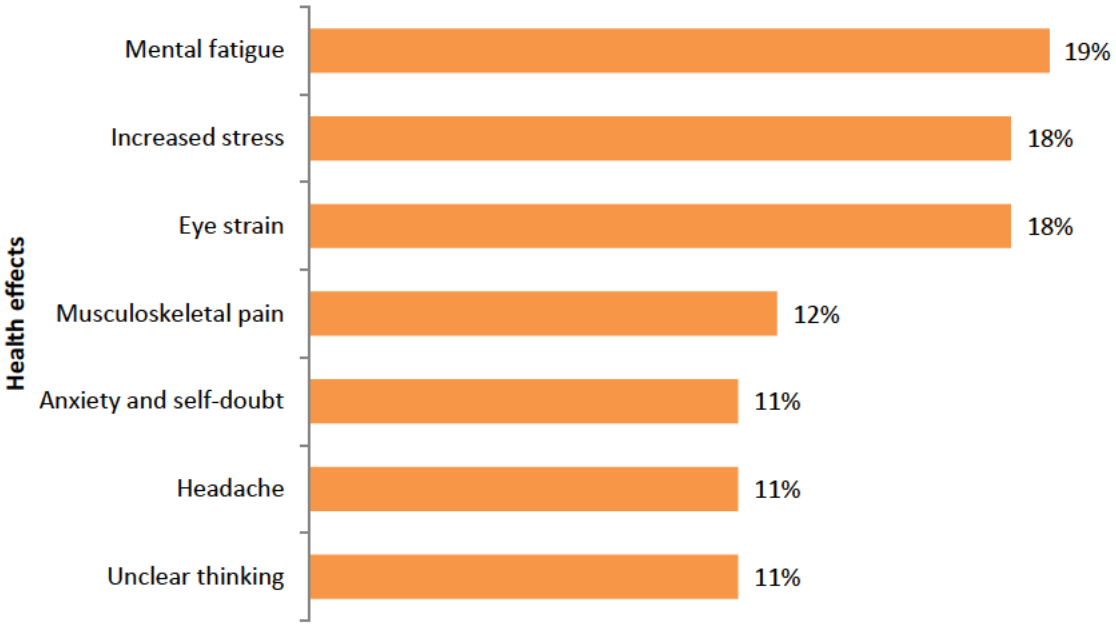

Figure 5.17: Health effects of information overload (n=486)

There were 162 respondents to this question, therefore 486 (162x3) responses. The data indicates that "Mental fatigue", "Increase in the level of stress" and "Eye strain" were the most prevalent health effects of information overload. Farhoomand and Drury (2002) reported that 25% of managers from Hong Kong, Singapore, the U.K. and the U.S. suffered ill health ranging from headaches to depression, as a direct result of the enormous amount of information they must absorb.

5.6.3.4 Ways to managing information overload by time

Time management is essential, particularly when one is faced with large volumes of information to process. Table 5.8 includes five factors regarding how respondents manage information in terms of time.

Table 5.8: Time spent managing information

Rank	Managing information	Mean
1	Deciding how to handle incoming messages and communications	2.69
2	Gathering information from sources other than the Internet	2.95
3	Preparing and assembling information for the use of others	2.96
4	Retrieving information already in my possession	3.05
5	Communicating information to others	3.36

Based on the data in Table 5.8, it is evident that the majority of respondents confirms that most time is spent on handling incoming messages. The results also confirm the study of Whelan and Teigland (2013) who found that respondents spent hours each day reading and responding to their e-mails. Gathering information from other sources rather than the Internet is the second most time-consuming factor in managing information overload. This study reveals that the least time spent is on communicating information to others.

5.6.4 Objective 4: To compare the level of information overload amongst companies in the shipping industry

Each of the questions were presented and discussed as part of the previous three objectives. Now this section presents information overload by the demographics of companies.

5.6.4.1 Distribution of respondents across the companies

Figure 5.18 illustrates the distribution of respondents across the organisations.

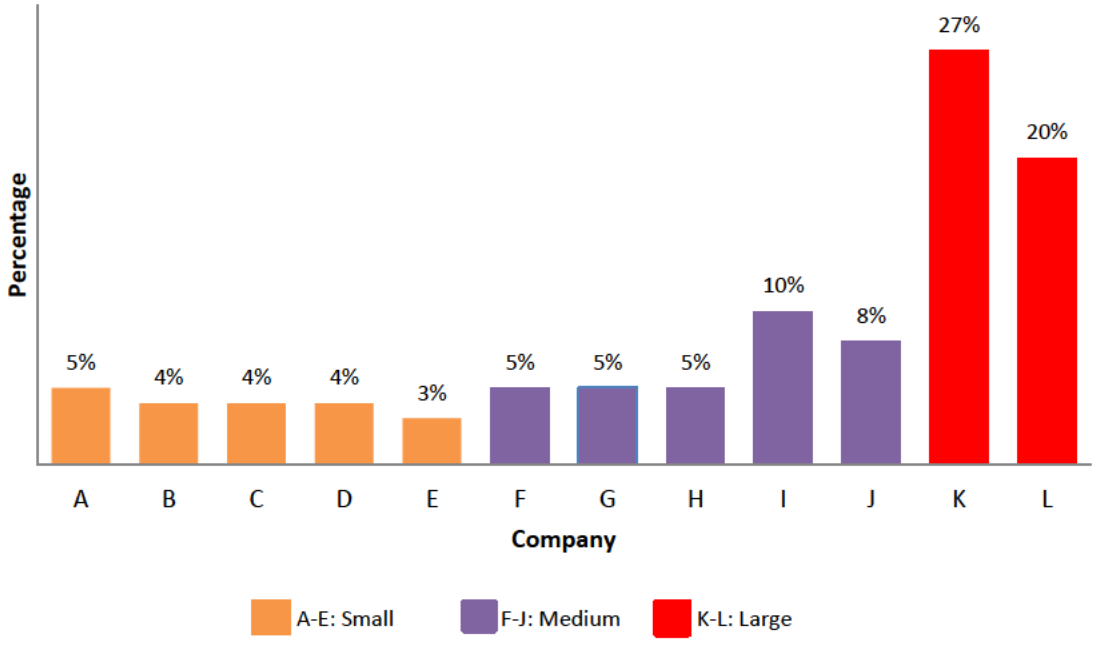

Figure 5.18: Respondents per company (n=421)

The majority (47%) of the respondents worked for large companies which stands to reason as large companies need more workers. Approximately a third (33%) worked for medium companies and only 20% worked for small companies.

5.6.4.2 Information overload across companies

Figure 5.19 illustrates how employees are overloaded across the surveyed companies.

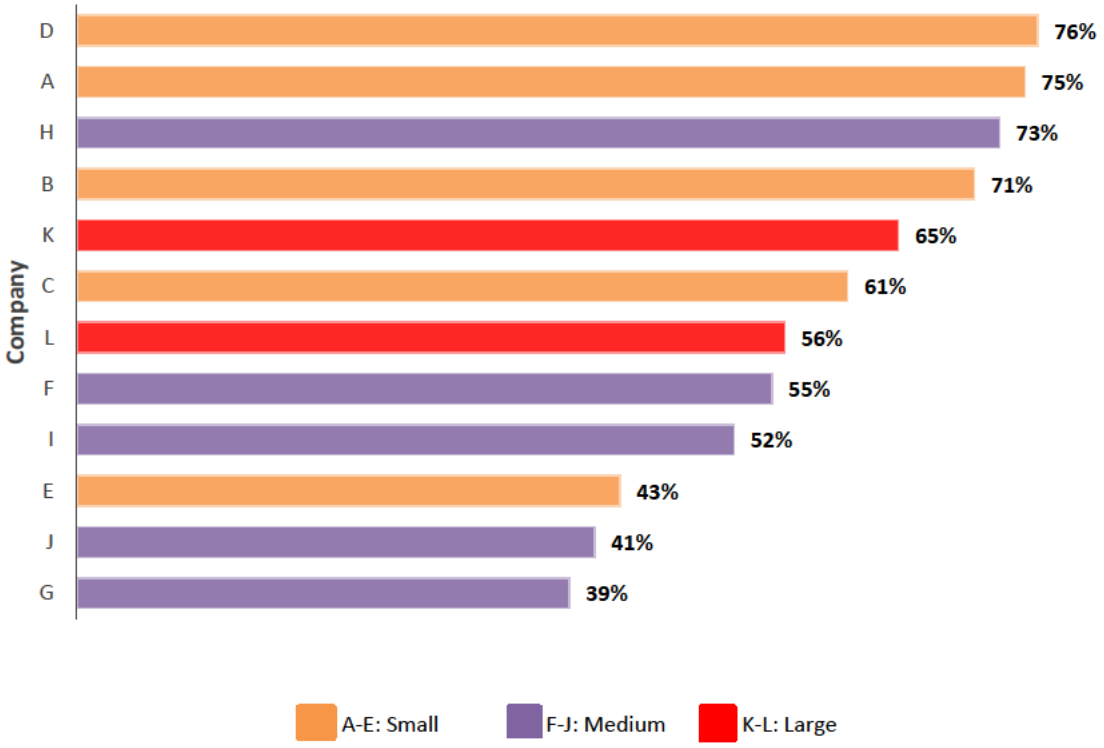

Figure 5.19: Information overload employees by company (n:248)

Three of the top four companies where employees are overloaded with information were small companies. The two companies with the lowest information overload rate were medium companies. One of the reasons for employees in smaller organisations being more affected could be that small shipping companies have less staff and therefore employees normally have varied responsibilities across multi departments (Zetlin, 2015).

The findings divert somewhat from the literature, where employees of larger organisations were found to be more likely to experience information overload compared to those working for smaller organisations (Sweeney Research, 2009).

5.6.4.3 *Information overload across companies and departments*

When comparing the different departments of the companies, it is evident that overall the operations department is the one which is most affected by information overload (Table 5.9).

Table 5.9: Information overload by department (n=248)

		Company												
		A	B	C	D	E	F	G	H	I	J	K	L	Total
Department	Operations	27	8	37	54	33	9	22	38	32	14	29	24	27
	Marketing	7	26		8	17	18	11	13	22	14	18	21	17
	Administra-tion	20	8	9		17	28	34	12	9	23	18	11	15
	Accounting Finance	13	42	18	15	33	9	11	19	18	14	5	11	13
	Customer services	7	8	18			18	11	12	9	7	14	11	11
	IT	13	8		8		9	11	6	5	14	4	9	7
	HR				15						7	7	9	5
	Production	7		9						5	7	4		3
	Other	6		9			9					1	4	2
	Total (%)	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

While it is evident that the operations department was the most overloaded in the majority of the companies (8 out of 12), in three companies the administration departments were the most overloaded. All these three companies (F, G and J) were medium sized organisations.

The descriptive statistic has shown data for each independent variable for all 12 companies surveyed under each of the objectives. Then, the quantitative data were presented by company and department to see whether the separated results offer any additional insight. The next section makes use of correlational analysis to describe relationships among the independent and dependent variables.

5.7 CORRELATIONS

Statistical tests were performed to help making judgements about the population from the data. Pearson's correlations for inter-objective and inter-item correlation tests were performed on the data and are presented in this section, followed by the comparison of dispersion statistics. Examination of the relationships between two or more variables often

offers much more insight into the underlying topic of interest than examining a single variable in isolation (Pettersson, 2005).

The correlation matrix based on Pearson's chi-square test of independence was used to analyse inter-objective correlations and inter-item correlations.

Pearson's chi-square test is a statistical test applied to sets of categorical data to test whether or not a statistically significant relationship exists between a dependent and an independent variable (StatisticsSolutions, 2016). The Chi-square can be used to calculate the p-value. The p-value is the probability of observing a sample statistic as extreme as the test statistic (Keller, 2006).

Keller (2006) provided the following guidelines for interpreting the p-value (**Table 5.10**):

Table 5.10: Describing the p-value

p-value	Significance
$p < 0.01$	Highly Significant
$0.01 \geq p \leq 0.05$	Significant
$0.05 \geq p \leq 0.10$	Not Statistically Significant
$p > 0.10$	No Significance

Source: Adapted from Keller (2006)

Correlations were conducted between and amongst certain key variables. The following section presents these correlations.

5.7.1 Objective 1: To determine whether employees are aware of information overload

This section compares dimensions dealing with the awareness of information overload by the employees in the 12 chosen shipping organisations with the various personal characteristics of the respondents. Crosstabulations were conducted to check if a relationship existed between being overloaded and the independent demographic variables (Table 5.11).

Table 5.11: Being overloaded and independent variables

		Are you overloaded with information?		
		Chi-square	p	Relationship?
Independent variables	Age	12.737	0.013	Yes
	Gender	0.441	0.507	No
	Race	1.955	0.582	No
	Highest level of education	13.674	0.018	Yes
	Position	6.168	0.187	No
	Department	3.975	0.859	No
	Experience using computers	7.864	0.097	No
	Competence using computers	5.504	0.138	No
	Company	19.61	0.051	No
	Size of company	5.988	0.050	Yes

Table 5.11 shows relations between "Are you overloaded?" and age groups, education and size of the company.

5.7.1.1 Crosstabulation of respondents who are overloaded with information and age group

Comparisons were undertaken to determine any differences within the age groups when respondents were asked whether they were overloaded with information (Table 5.12).

Table 5.12: Crosstabulation between being overloaded and age group

		Overloaded	Not overloaded	Total %
Age	20-29	12	8	**20**
	30-39	17	18	**35**
	40-49	20	10	**30**
	50-59	7	4	**11**
	60 years and over	3	1	**4**
	Total	**59**	**41**	**100%**
Chi-square: 12.737		p=0.013		n=421

Of the respondents who indicated they were overloaded, the majority were from the 40-49 year age group, followed by a fairly large number of young employees in the 20-29 year age group. There was no significant difference in the 30-39 year group in terms of being overloaded or not. Furthermore, 10% (7%+3%) of the respondents over the age of 50

indicated they are overloaded versus 5% (4%+1%) who said they are not overloaded. Thus, almost 2/3 of the respondents over the age of 50 are overloaded.

The findings agree with Beaudoin (2008), who found older respondents to have higher levels of perceived information overload, but divert from the study by Cornerstone OnDemand (2012), which suggests that the younger generation, people aged between 18 and 32, are the most affected by information overload. The findings also divert from Benselin and Ragsdell (2016) who found a lower rate of information overload among age group 51-70.

5.7.1.2 Crosstabulation of respondents who are overloaded by information and education

One of the questions in the literature is the connection between information literacy and education (Bawden & Robinson, 2008). A comparison of the respondents' qualification against the respondents who are overloaded with information is presented in Table 5.13.

Table 5.13: Crosstabulation between being overloaded and education

		Overloaded	Not overloaded	Total %
Education	High School	18	15	**33**
	Post Matric Diploma	17	15	**32**
	University Degree	10	6	**16**
	Post Graduate Diploma/ Honours Degree	8	4	**12**
	Master's Degree	6	1	**7**
	PhD/Doctorate	0	0	**0**
	Total	**59**	**41**	**100%**
Chi-square: 13.674		p=0.018		n=421

This data reveals that high school certificate and postgraduate diploma holders were equally likely to be experiencing information overload. Figure 5.20 illustrates the relationship between being overloaded and education level.

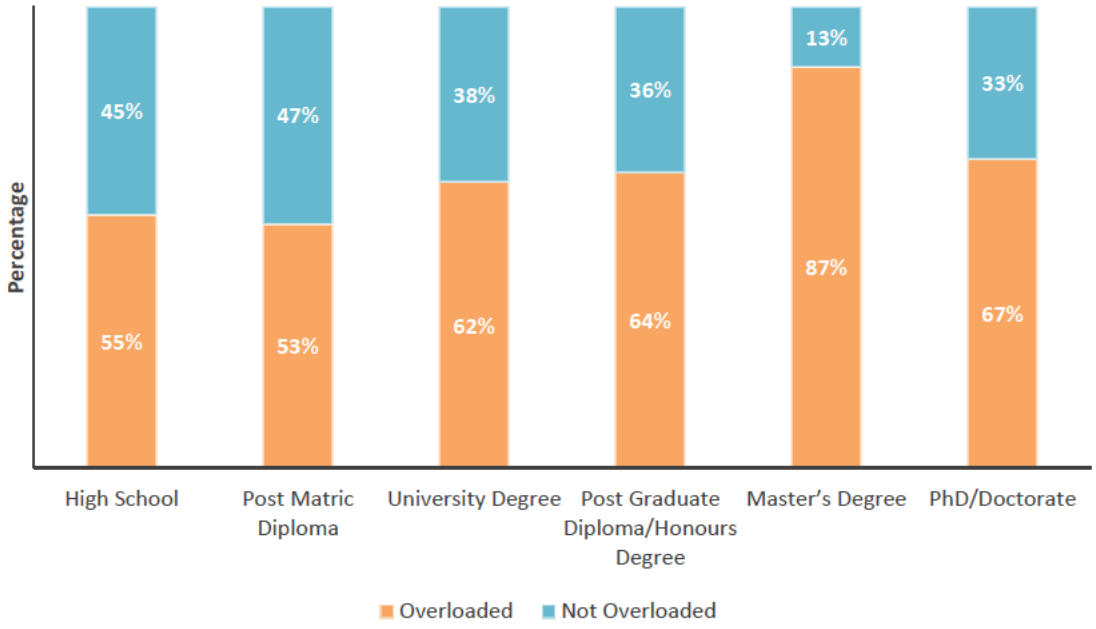

Figure 5.20: Relationship between respondents who are overloaded and education (n=248)

There is a higher rate of information overload among the respondents with higher qualifications. For example, 87% of master's degree holders indicated that they are overloaded. This is in line with the findings of Bawden and Robinson (2008) who stated that education can contribute to the digital divide where a proportion of people are deprived of adequate access to digital information resources. Since the level of education has a relation with information overload, it is necessary to also check the combined relation with the position in the company.

5.7.1.3 Crosstabulation of recurrence of overload and position in the organisation

Table 5.14 summarises employees' responses to the question asking when they started feeling the effect of information grouped by the position they hold in the organisation.

Table 5.14: When employees started feeling overloaded according to their job position

		I started feeling overloaded:				
		From the time I joined the organisation	Between 3 and 5 years since joining the organisation	From the time I was promoted to a senior position	Other	Total %
Position in the organisation	Non-management	23	13	5	5	**46**
	Supervisor	4	3	7		**14**
	Junior Manager		2	3		**5**
	Middle Manager	6	4	5	2	**17**
	Senior Manager	2	4	10	2	**18**
	Total	**35.48**	**25.41**	**29.03**	**10.08**	**100%**
Chi-square: 48.428			p=0.00		n=248	

The data show that higher position employees (Junior Manager:3% and Senior Manager:10%) started experiencing information overload after job promotion. This is not the case for middle managers, where the highest number of respondents (6%) experienced information overload from the time they joined the company. Likewise, non-managers (23%) have been overloaded from the time they joined the company. Furthermore, this study shows a relationship between position in the organisation and information overload ($p=0.00$, $p<0.05$). Therefore, management should reassess their businesses since newcomers are experiencing information overload right from the start. It is also a concern that senior managers are suffering when they are promoted in the company.

5.7.1.4 *Crosstabulation of ways to minimise electronic information and hard to understand information*

Table 5.15 shows that there is a correlation between the type of electronic information received and the perception of what help is needed to minimise information overload.

Table 5.15: Responsible party for minimising hard to understand electronic information

		The type of electronic information I receive at work is easy to understand		
		Disagree	**Agree**	**Total %**
Minimise Information Overload	Management intervention	30	11	**41**
	Adjusting my own practices	53	6	**59**
	Total	**83**	**17**	**100%**
Chi-square: 111.002		p=0.000		n=421

According to Edmunds and Morris (2000), having a personal information management strategy is key to reducing information overload. Their results are closely related to this study's findings in that 53% of the respondents felt that the information they received was easy to understand and that they minimised their overload by adjusting they own practices. Conversely, 11% of the respondents felt that management intervention was necessary to reduce information overload since they experienced problems to understand the information they received at work.

5.7.1.5 *Independent variables with no correlations with being overloaded*

The data from this survey does not show any correlation between being overloaded and gender, race, position in the company, department, experience and company. But even if the variables do not have a correlation coefficient less than 0,05, it is important to show the frequencies of some of these variables.

- **Frequency distribution of respondents who are overloaded, race group and gender**

Comparisons were undertaken to determine the respondents who are overloaded based on the four race groups (Figure 5.21).

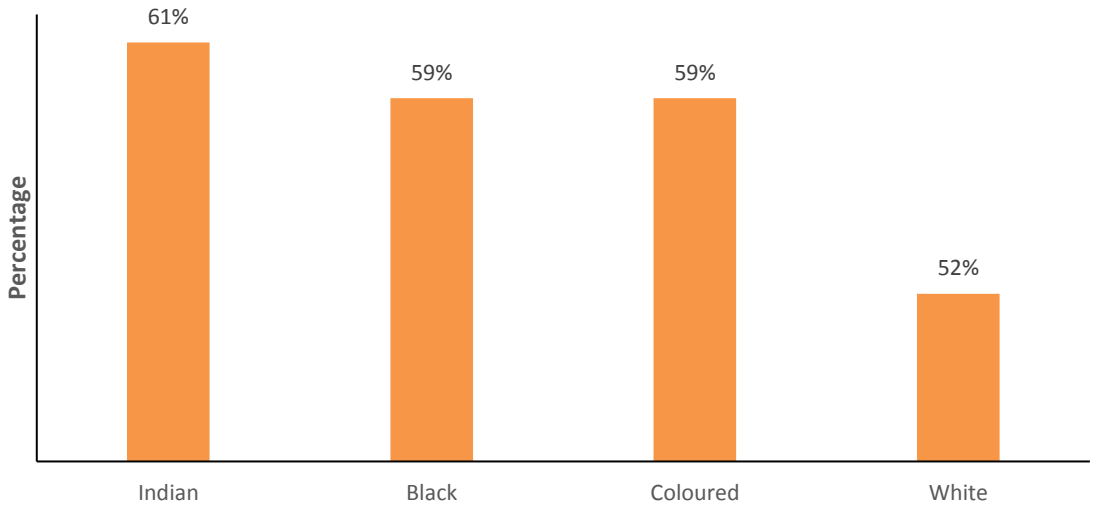

Figure 5.21: Information overload among race groups (n=248)

A high percentage of Indians (61%) stated they feel overloaded with information. This was followed by Blacks (59%) and Coloureds (59%). Whites (52%) were the least affected. A possible explanation may be because Whites were previously advantaged in the quality of education and exposure to technology (Case & Deaton, 1999; Letseka & Maile, 2008).

Likewise, it is interesting to comprehend how among the different race groups, information overload affects respondents in terms of their gender and education (Figure 5.22).

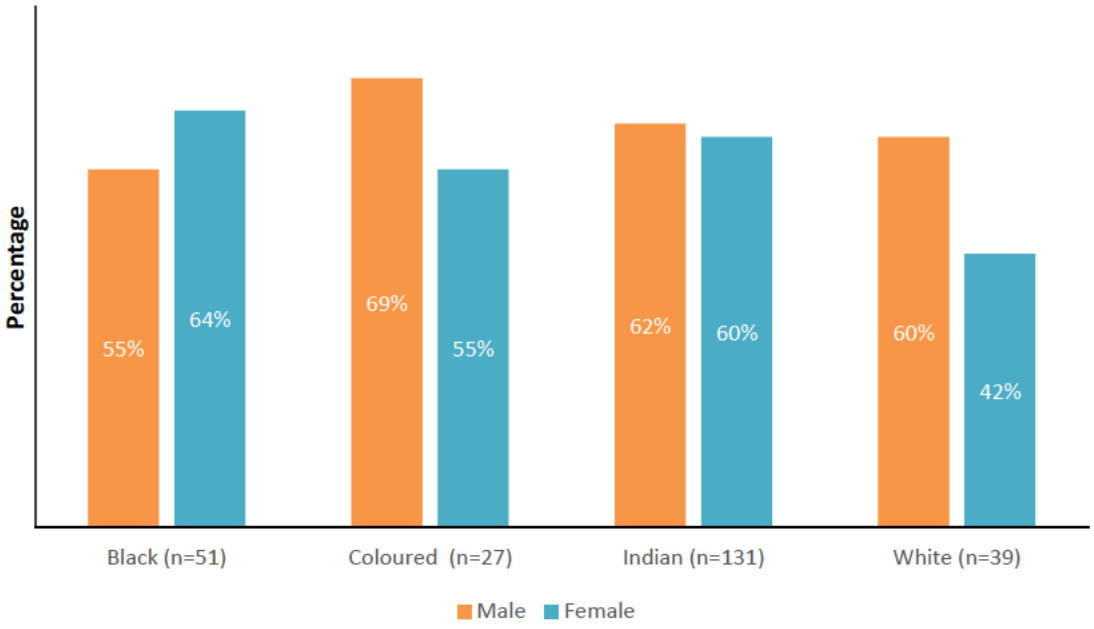

Figure 5.22: Distribution of respondents who are overloaded by race and gender (n=248)

In three of the race groups, more male respondents indicated that they are overloaded compared to female respondents, apart from the Black race group where 64% of females were overloaded. Again, this can be linked to black women being previously disadvantaged (Case & Deaton, 1999). Furthermore, the most overloaded group was Coloured males (69%). The least difference between gender occurred in the Indian race group where 62% of males and 60% of females indicated they are overloaded. The results do not support the findings of Holton and Chyi (2012) and Allen and Wilson (2003), who indicated females to feel more overloaded.

- **Frequency distribution of respondents who are overloaded against education and job position**

Since education seems to be somewhat related to overload experienced by the respondents, further analysis was conducted (Figure 5.23).

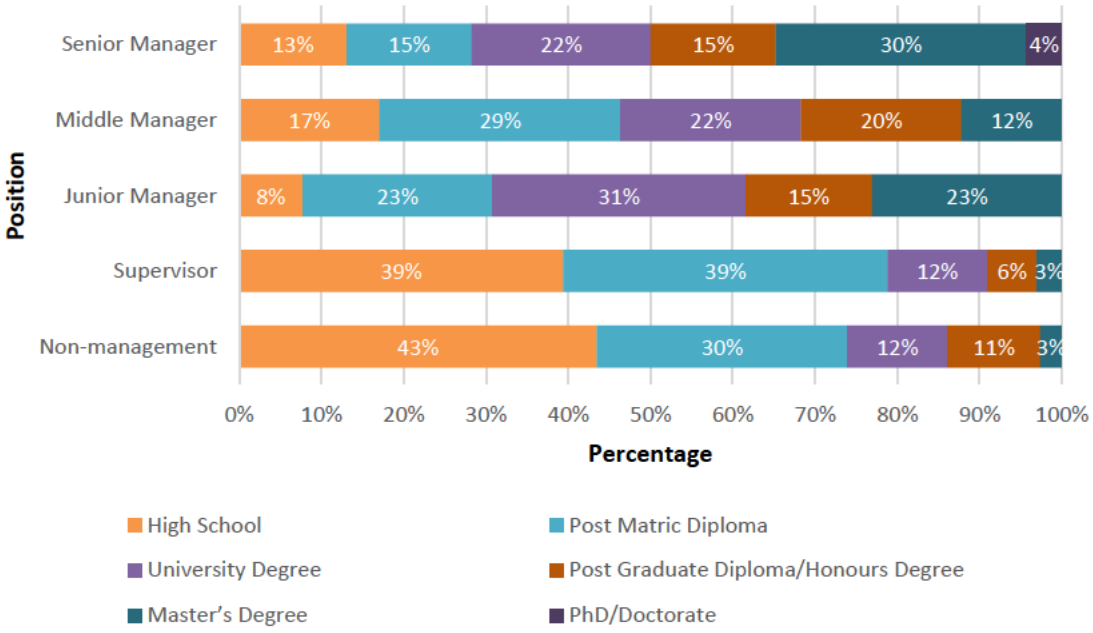

Figure 5.23: Education vs. job position of respondents who are overloaded (n=248)

Figure 5.23 clearly shows that among the non-management group who indicated they are overloaded, 43% have high school education. Similarly, 39% of supervisors who said they are overloaded have high school as their highest education qualification. It should be a concern for management that highly qualified staff who are trained in the art of synthesising and summarising information are suffering from information overload.

5.7.2 Objective 2: To Identify what the sources of information overload are

The dimensions of this study concentrating on identifying the sources of information overload were compared across the various personal characteristics of the respondents. Chi-square tests were applied to compare these dimensions and are presented next.

5.7.2.1 Crosstabulation of impact of modern technology and position

To investigate the relationship between position in the organisation and increase in level of information by modern technology, a correlation analysis was run and the results are presented in Table 5.16.

Table 5.16: Increase in level of information overload by position

		Has your level of information overload increased with modern technology?		
		Yes	No	Total %
Position	Non-management	40	6	**46**
	Supervisor	13	0	**13**
	Junior Manager	5	0	**5**
	Middle Manager	15	2	**17**
	Senior Manager	19	0	**19**
	Total	**92**	**8**	**100%**
Chi-square: 10.558		p=0.032		n=248

From Table 5.16, it is clear that the majority of respondents across all levels of the organisations agreed that modern technology has increased their level of information overload. Only 6% of the non-management respondents felt that modern technology had no impact on their information overload.

5.7.2.2 Crosstabulation of information type preferences and race group

The researcher analysed the type of information that respondents in the various race groups indicated they prefer to receive. The results are listed in Table 5.17.

Table 5.17: Type of information preferences by race group

		The type of information I prefer to receive			
		Electronic	Written/Printed	Verbal	Total %
Race	Black	13	5	3	**21**
	Coloured	8	1	2	**11**
	Indian	44	2	5	**51**
	White	14	1	2	**18**
	Total	**80**	**9**	**12**	**100%**
Chi-square: 38.508		p=0.000		n=421	

Across all race groups, the majority of respondents indicated that they prefer electronic communication instead of written/printed and verbal. Amongst those who said they prefer written communication, Blacks (5%) were in the majority. Indians were the highest group for electronic and verbal communication.

5.7.2.3 *Crosstabulation of information type preferences and computer experience*

A significance test was conducted on the type of preferred information and the number of years of experience in using computers (Table 5.18).

Table 5.18: Preferred type of information with experience in using computers

		The type of information I prefer to receive			
		Electronic	**Written**	**Verbal**	**Total %**
Experience using computers	Less than 1 year	1	1	1	**3**
	1 to 5 years	9	3	2	**14**
	6 to 10 years	14	1	2	**17**
	11 to 15 years	13	0	1	**14**
	Over 15 years	43	3	6	**52**
	Total	**80**	**8**	**12**	**100%**
Chi-square: 33.553			p=0.000		n=421

In this study, there was a significant difference between the preferred type of information and computer experience ($p<0.05$). Results presented in Table 5.18 indicate that electronic communication is indeed the most preferred method of communication for businesses. An interesting fact is people with less than one-year experience prefer verbal communication. Moreover, those who had worked for more than 15 years were in the majority in their preferences for all three types of communication.

5.7.2.4 *Relationship between relevance of information and departments*

Results from Table 5.6 indicated that two thirds of the respondents agreed that information they receive at work is relevant to do their work. However, to better show the relationship between the different departments, Figure 5.24 has been prepared.

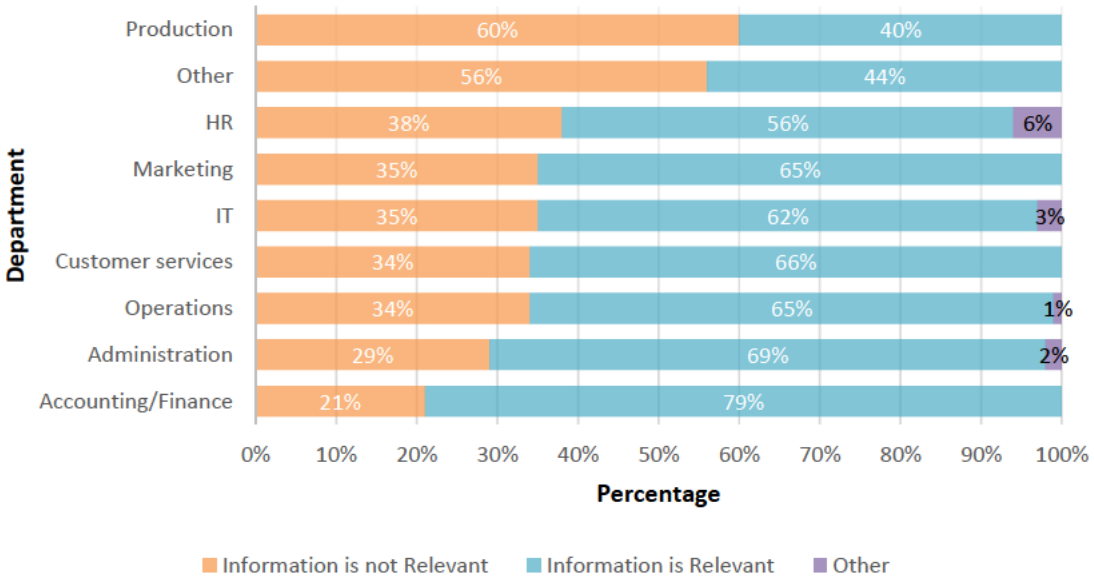

Figure 5.24: Relevance of information against departments (n=421)

The results show that the production department receives the most irrelevant information (60%). Conversely, in all the other departments, the majority found the information received at work to be relevant. It is a concern, however, that for six other departments, more than one third of information received is irrelevant which requires further attention from management and/or employees.

5.7.2.5 Relationship between timeliness of information and department

Figure 5.25 illustrates the results of comparing each department and the quality of information in terms of timeliness.

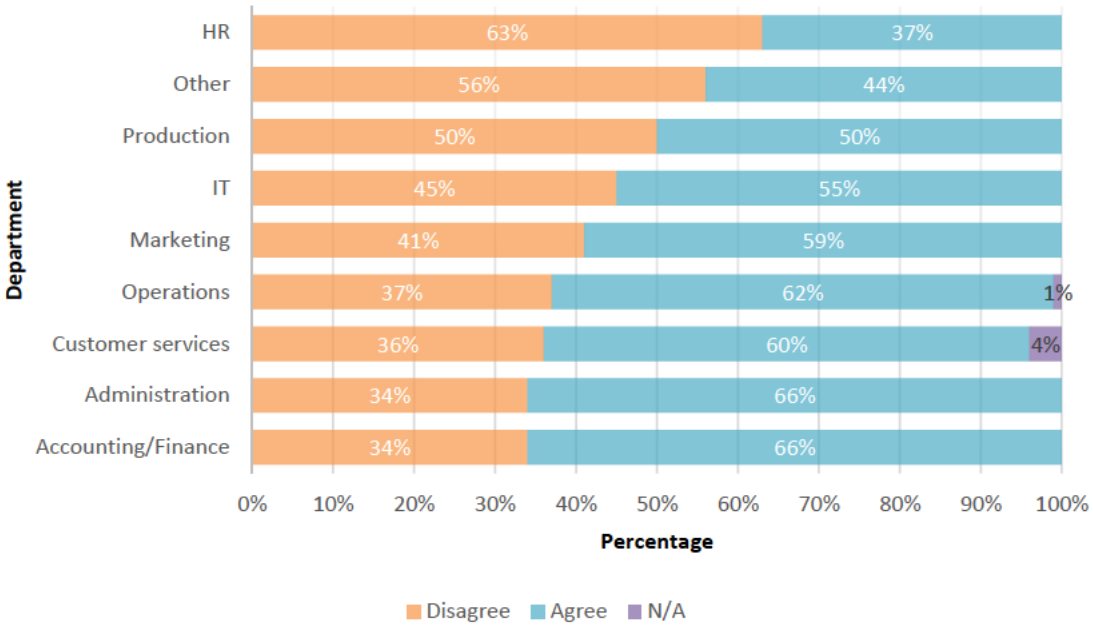

Figure 5.25: Timeliness of information against department (n=421)

The human resource (HR) department is the only one with a majority of respondents not receiving information on time to do their work (63%). In all the other departments, the majority of the respondents agreed that information is available on time for them to do their work. What is of concern is that production and IT do not receive information timeously.

5.7.3 Objective 3: To assess the effect of information overload on employees

Given that the third objective is to identify the sources of information overload, this section uses the Chi-square test to compare the dimensions measuring the effect of information overload with respect to age, gender, race group, computer experience and department. The discussions on the comparisons are presented next.

5.7.3.1 Crosstabulation of effect of information overload on job performance and age group

To check if the effect of information overload on job performance is related to age of the respondents, a cross tabulation was prepared showing the relationship (**Table 5.19**).

Table 5.19: Effect of information overload on job performance against age

		Information overload has a negative impact on job performance			
		Disagree	**Strongly**	**N/A**	**Total %**
Age in years	20 - 29	8	12	0	**20**
	30 - 39	17	16	1	**34**
	40 - 49	12	18	0	**30**
	50 - 59	5	6	0	**11**
	60 and over	1	4	0	**5**
	Total	**43**	**56**	**1**	**100%**
Chi-square: 34.414		p=0.005			

Data presented in Table 5.19 is statistically significant at the 95% level of significance ($p \leq 0.05$). This means that a significantly higher proportion of employees within the different age groups indicated they feel that information they receive at work has a negative impact on their job performance. Only the respondents from the age group 30-39 showed a higher disagreement (17%) compared to agreement (16%) towards impact of information overload on job performance. One explanation for this result may be that respondents in that age group have more experience in the job and thus better understand the information requirements in the industry. Secondly, as per Table 5.12, the majority of the respondents in the age group 30-39 agreed that information overload does not have a negative impact on their job performance. In all the other age groups, the majority responded that information overload negatively affects their job performance.

5.7.3.2 *Relationship between the effect of information overload on job performance and department*

The effect of information overload on job performance was further cross checked against the departments in which the respondents worked (Figure 5.26).

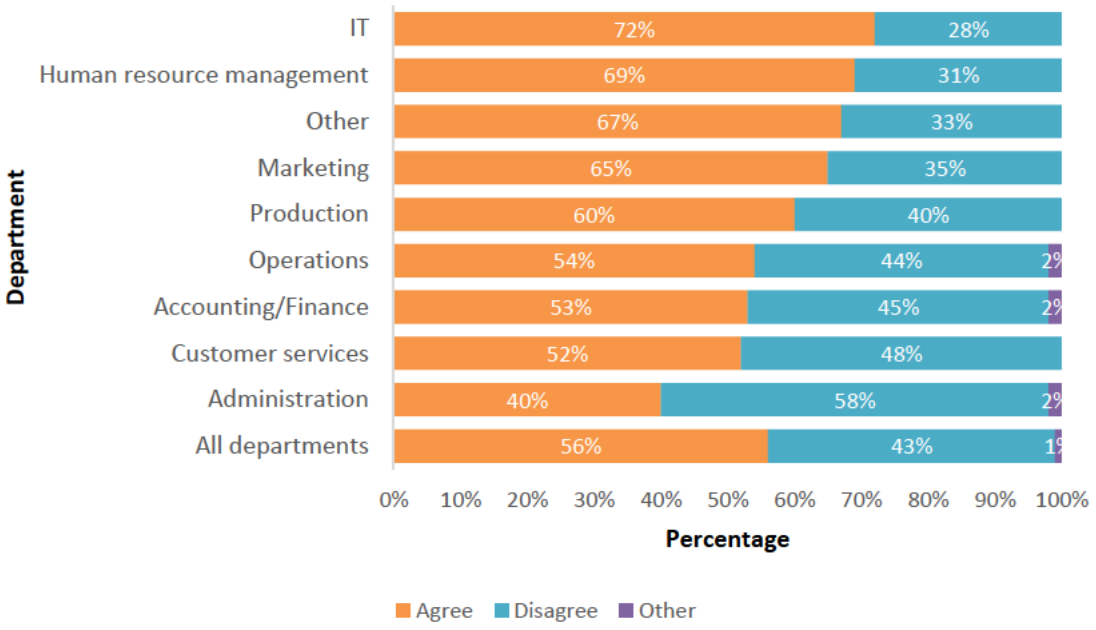

Figure 5.26: Effect of information overload on job performance by department (Chi-square: 60.258, p=0.002, n=421)

Results indicate that 56% agreed that information they receive at work has a negative impact on their job performance. However, only in the administration department, there are more respondents whose job performance is not affected by information overload. Contrariwise, in all the other departments, the majority indicated information overload to have a negative effect on job performance. The results somewhat support prior findings that the characteristics of a task can be considered as a determinant of the perceived information load where the complexity of the task is sometimes determined by the department or team (de Bakker, 2007).

5.7.3.3 Relationship between searching for a document and education level

To show the relationship of how the education level affects the searching of documents in the organisation, Figure 5.27 has been prepared.

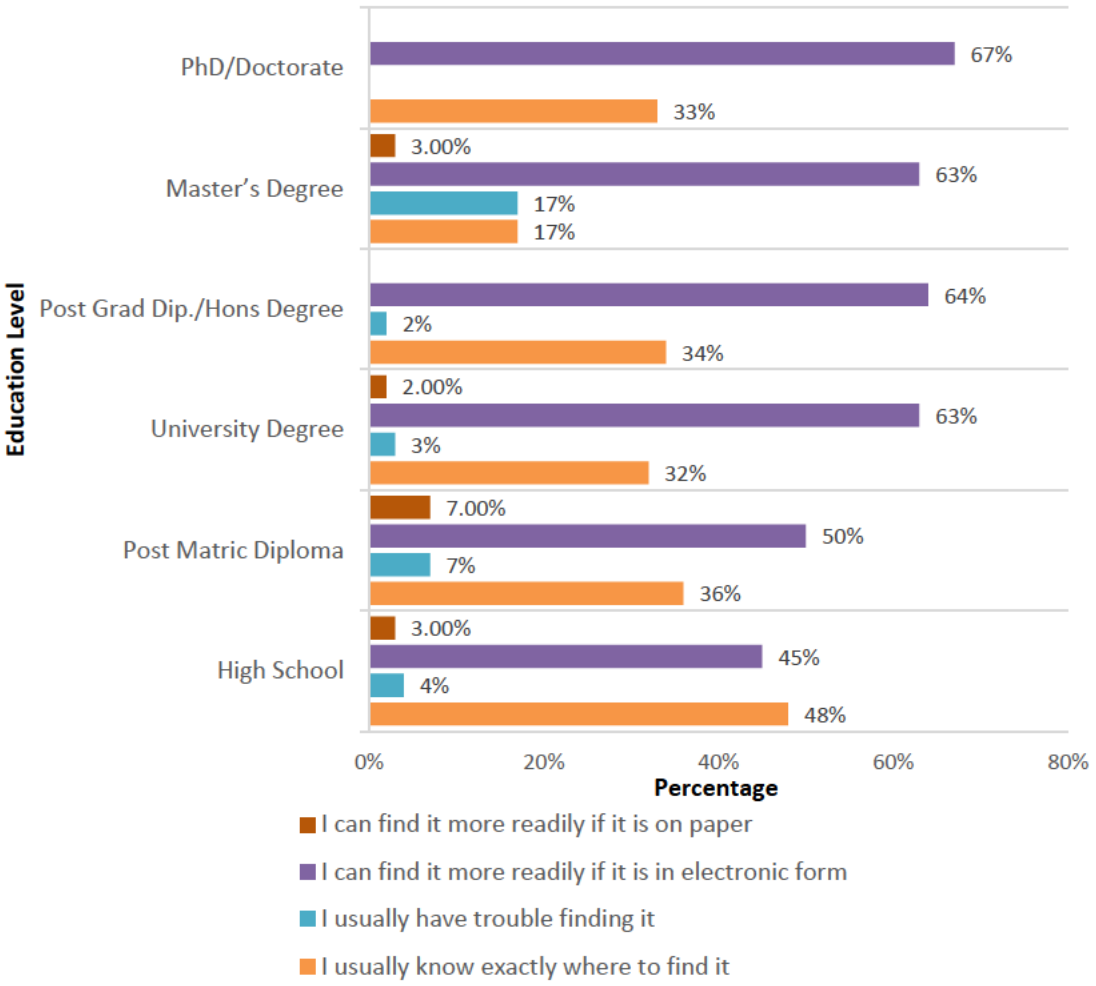

Figure 5.27: Searching for documents and education level (n=421)

When searching for a document already in their possession, the majority of the respondents (39%, Figure 5.16) across five of the six levels of education groups stated that they can find it more readily if it is in electronic form (online or stored on their computers). The only exception was the respondents having high school as their highest level of education (Figure 5.27). In this category, a slight majority (48%) usually know exactly where to find the documents they are looking for versus 45% who said they can find it more easily when the document is stored electronically. This may be because most of the high school

holders have more junior positions and their job functions do not require a lot of information.

5.7.3.4 Crosstabulation of personal ways of minimising information and gender

Table 5.20 provides a comparison between male and female respondents' feedback regarding the preferred way to minimise information overload between males and females.

Table 5.20: Personal ways to minimise information overload by gender

		Gender		
		Male	**Female**	**Total**
Ways to minimise information overload	Improve my information screening skills	24	11	**35**
	Improve my priority-setting practices	20	20	**40**
	Limit my number of e-mail and social networking accounts	4	7	**11**
	Turn off instant e-mail notifications	2	4	**6**
	Work from home	3	2	**5**
	Other	3	0	**3**
	Total	**56**	**44**	**100%**
Chi-square: 16.339	p=0.006		n=250	

The majority of male respondents (24%) said that improving their information screen skills is the better way to reduce information overload. This is closely followed by improving their priority-setting practices (20%). Conversely, female respondents said that to better manage information overload, they prefer to improve their priority-setting practices (20%). Improving information screening skills was the second choice with 11%. In terms of limiting the number of e-mail and social networking accounts, 4% of female respondents agreed that it will help decreasing information overload, compared to 2% of the male respondents. One possible reason might be because females have more social accounts than males have (BI Intelligence, 2015).

5.7.3.5 Crosstabulation information overload and health effects

Table 5.7 showed that 38% of the respondents' physical wellbeing is affected by the excessive amount of information they receive at work.

Table 5.21 illustrates the health effects of information overload compared to whether the respondents are experiencing information overload.

Table 5.21: Information overload against health effects on well-being (n=162)

		Overloaded with information?		
		Yes	No	Total
Health effects	Mental fatigue	14	5	19
	Increased stress	14	4	18
	Eye strain	13	5	18
	Musculoskeletal pain	10	2	12
	Anxiety and self-doubt	10	1	11
	Headache	8	3	11
	Unclear thinking	9	2	11
	Total	**78**	**22**	**100%**
Chi-square: 12.880		p=0.045	n:162	

The results showed that most of the respondents who stated they are experiencing information overload have experienced an increase in their level of stress (18%) and mental fatigue (19%). Conversely, the respondents who are not overloaded with information, said that they regard mental fatigue (5%) and eye strain (5%) as major health problems.

5.7.4 Objective 4: To compare the level of information overload amongst companies in the shipping industry

The fourth objective of this survey was to compare the level of information overload amongst shipping companies. This section presents the variable company that was analysed against the components of the questionnaire. Whenever there was no correlation, then other variables pertaining to the organisation, such as size and number of South African branches, were used as covariates.

5.7.4.1 Information overload by company

To compare how employees across the 12 surveyed companies are overloaded with information, Figure 5.28 has been prepared.

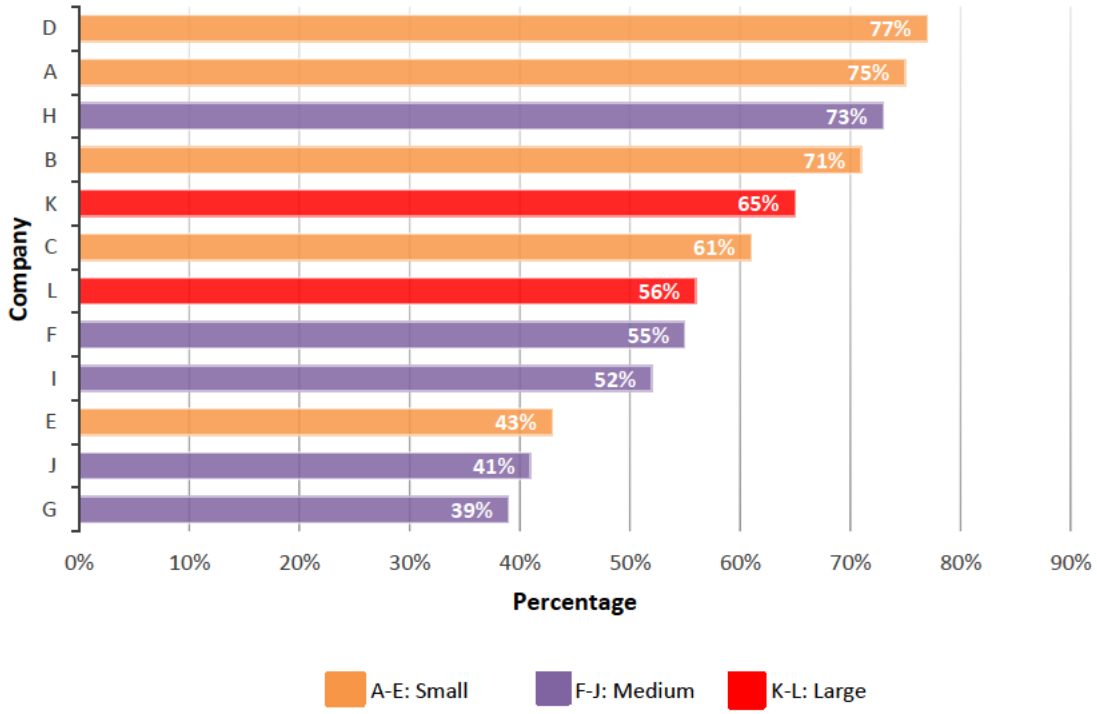

Figure 5.28: Information overload in companies

Among the top four companies with the highest number of overloaded staff, three are small size companies and one is medium in size. Furthermore, analysis of the data shows that there is no correlation between the individual organisations surveyed and the perception of the respondents of whether they are overloaded or not. Further analysis revealed a correlation when the size of the company was correlated against the perception of being overloaded (Table 5.22).

Table 5.22: Information overload by size of company

		Overloaded	Not overloaded	Total %
Size of organisation	Small	14	7	21
	Medium	17	16	33
	Large	28	18	46
	Total	**59**	**41**	**100%**
Chi-square: 5.988		p=0.050		n=421

The results of the chi-square comparison between size of the company and whether respondents feel they are being overloaded with information is statistically significant at the 95% level of significance ($p \leq 0.05$). A significantly higher proportion of employees within

the differently sized companies indicated that they feel they are being overloaded with information. In small and large companies, an overwhelming majority are overloaded with information (14% and 28% respectively). In medium companies, respondents indicated almost equally being overloaded (17%) and not overloaded (16%) with information. These results digress from the Sweeney Research (2009) on IT companies in Australia and New Zealand, which reported that larger organisations are more likely to experience more information overload than smaller organisations.

5.7.4.2 Relationship between whose responsibility it is to manage information overload and company

In addition to being aware of the existence of information overload, it is likewise crucial to identify who the respondents believe is responsible to manage information overload (Figure 5.29).

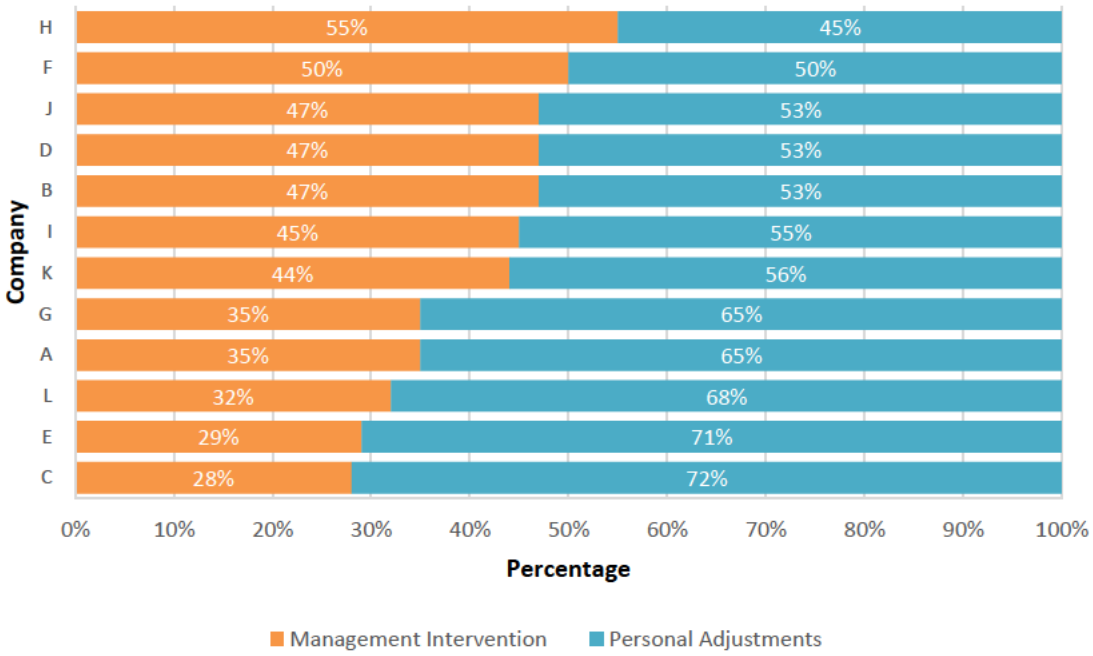

Figure 5.29: Responsibility for managing information overload (n=421)

The majority of the respondents suggested that to better manage information overload employees should adjust their own practices. In Company H, the majority (55%) of the respondents stated that they feel management should intervene to help to manage

information overload. It is evident, however, that all respondents felt management should intervene. It is only companies C, E and L where less than third of the respondents wanted management intervention.

For management to be able to help curb information overload, the feedback of the respondents who prefer management help is crucial for policy development. This feedback of the respondents is shown in Table 5.23.

Table 5.23: Management intervention to manage information overload (n=172)

	Company											
	A	B	C	D	E	F	G	H	I	J	K	L
Develop policies to minimise information overload	43	24	20	38	50	20	13	58	26	31	33	23
Provide training to cope with information overload	14	13	20	50	25	20	50	17	26	13	22	27
Introduce technology to minimise information overload		50	20	12		50	13	8	22	31	19	27
Limit electronic communication to work hours only	14							17	26	13	12	15
Have fewer meetings	29	13	40		25	10	24			12	12	
Other											2	8
Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Respondents from six of the companies (A, E H, I, J and K) advocated that management should develop policies to minimise information overload. Management should provide training to cope with information overload was the majority choice of four companies (D, G, I and L). Introducing technology to minimise information overload was also the majority choice in Company B and Company F. In company C, the majority of respondents (40%) suggested that management should reduce the number of meetings as a means of reducing information overload.

5.7.4.5 Relationship between timeliness of information and organisations

The Chi-square test was applied to compare the timeliness of information against the different departments in the organisation (Figure 5.30).

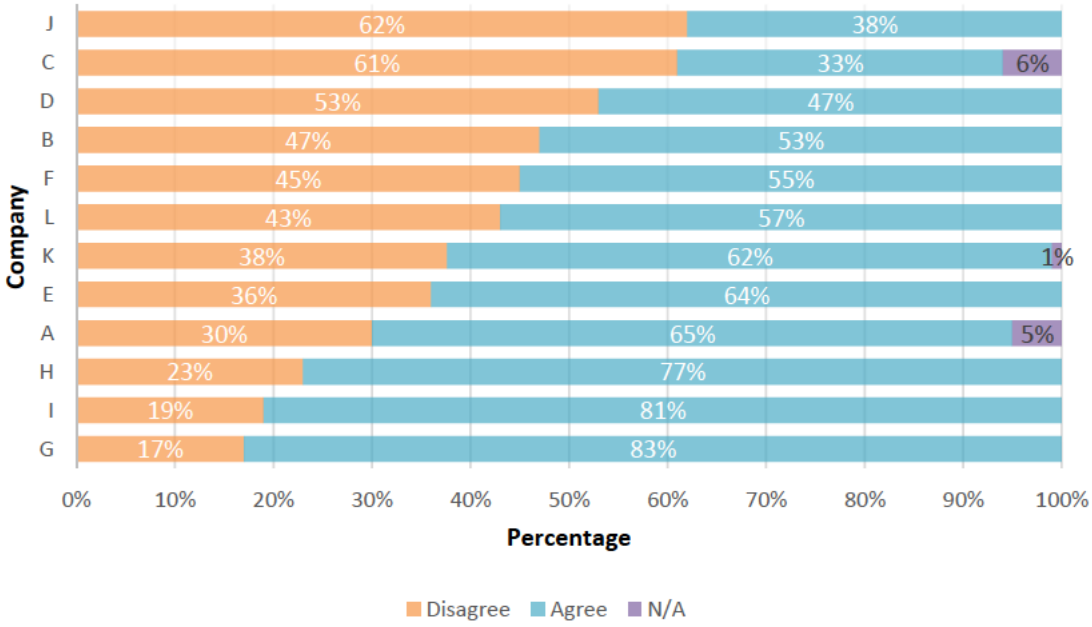

Figure 5.30: Comparison of timeliness of information at work by companies (Chi-square:64.398, p=0.024, n=421)

According to Figure 5.30, a significantly higher proportion of employees at the different companies indicated that they feel the electronic information is available on time to do their work. In companies C, D and J, the majority of employees indicated that they find the electronic information is not available on time. In all the other companies, employees agreed that the information they receive at work is on time for them to do their work.

5.8 FACTOR ANALYSIS

Variables causing information overload and the effect of information overload variables were subjected to factor analysis. The first step was to look at the inter-correlation between variables. Principal components (factors) were computed for the Likert scale questions. The two components Q20-Q24 and Q27-Q31 both accounted for over 50% of the total variance. Cronbach's alphas were computed for these components (Table 5.24).

Table 5.24: Factor analysis

Components	No of Items	Cronbach's alpha
Factor 1: Quality of electronic information Q20 The type of electronic information I receive at work is hard to understand. Q21 The quality of electronic information I receive at work is clear and concise for me to do my work. Q22 The quality of electronic information I receive at work is not relevant for me to do my work. Q23 The electronic information I require to do my work is not available timely enough. Q24 I feel that information overload has a negative impact on my job performance.	5	0.7
Factor 2: Effect of excessive electronic information Q27 The excessive amount of electronic information I receive at work negatively affects my work performance. Q28 The excessive amount of electronic information I receive at work negatively affects my relationships with colleagues. Q29 The excessive amount of electronic information I receive at work negatively affects my relationship with my family. Q30 The excessive amount of electronic information I receive at work negatively affects my relationship with my friends. Q31 The excessive amount of electronic information I receive at work negatively affects my physical well-being.	5	0.8
Overall	**10**	**0.8**

As explained in Section 5.3, the Cronbach's alphas for the factors indicate a high degree of internal consistency. Therefore, this proves that the components have been chosen correctly.

Next, the one-sample Kolmogorov-Smirnov test was performed to check for normality (Table 5.25).

Table 5.25: One-sample Kolmogorov-Smirnov test

Factor	n	Test statistic	p
Quality of electronic information	421	0.146	0.000
The effect of excessive electronic information	421	0.160	0.000

The result of the Kolmogorov-Smirnov test indicates that the dimensions do not follow a normal distribution ($p<0.05$). Hence, non-parametric testing was conducted.

Table 5.26: Kaiser-Meyer-Olkin and Bartlett's tests

KMO and Bartlett's tests	
Kaiser-Meyer-Olkin measure of sampling adequacy	0.812
Bartlett's test of sphericity	
Approx. Chi-square	1169.586
Df	45
Sig.	0.000

The Kaiser-Meyer-Olkin (KMO) test determines how suited the data is for factor analysis by measuring the sampling adequacy for each variable in the model and for the complete model (Andele, 2016b). Andele (2016b) added that a KMO value between 0.8 and 1 indicates the sampling is adequate. As can be seen in Table 5.26, the Kaiser-Meyer-Olkin of this questionnaire is 0.812 (>0.8 and <1.0) which indicates that the sample is adequate for factor analysis.

The Bartlett's test of sphericity relates to the significance of the study and shows the validity and suitability of the responses collected to the problem (Peri, 2012). Furthermore, for factor analysis to be recommended suitable, the Bartlett's test of sphericity must be less than 0.05 (Peri, 2012). Therefore, as per Table 5.26, the Bartlett's test of sphericity is highly significant (0.00 which is less than 0.05) and therefore it is confident to say that factor analysis is appropriate for these data.

5.8.1 Descriptive analysis of the factors

A descriptive analysis was performed on the two factors identified in this study; displaying the mean, median, variance and standard deviation (Table 5.27).

Table 5.27: Descriptive statistics of the factors

	Factors	
	Quality of electronic information	**Effect of excessive electronic information**
Mean	3.065	3.250
Median	3.000	3.200
Variance	0.244	0.337
Standard Deviation	0.494	0.581

The mean values reflected in Table 5.27 indicate a score of around 3 for both dimensions. This indicates that the average perception for both the factors is Disagree.

The standard deviation for the quality of electronic information was relatively high (0.494) which means that the data were dispersed evenly across the rating scale. The high value of the standard deviation (0.581) for the factor, "the effect of excessive electronic information", reveals that that this study can be generalised to the population of the sample, namely the 12 organisations in the shipping industry in Durban.

5.8.2 Inferential analysis of the factors

Inferential statistics use a random sample of data taken from a population to describe and make conclusions about the entire population (Keller, 2006). Most of the major inferential statistics are the t-test, analysis of variance (ANOVA), analysis of covariance (ANCOVA), regression analysis, and many of the multivariate methods like factor analysis, multidimensional scaling, cluster analysis, and discriminant function analysis (Trochim *et al.*, 2006).

The Kruskal-Wallis Anova, Mann-Whitney U and Wilcoxon W tests were computed to compare the two factors described in Table 5.24 against the independent and some dependents variables. The results of the test for the independent variable are presented in Table 5.28 and dependent variables are presented in Table 5.29.

Table 5.28: Test statistics of the factors and independent variables

	Quality of effective electronic information		Effect of excessive electronic information	
Independent variable	**Chi-square**	**p**	**Chi-square**	**p**
Age	5.858	0.210	14.981	0.005
Gender	Wilcoxon 4370.000	0.045	Wilcoxon 4576.000	0.293
Race	0.934	0.817	2.371	0.499
Highest level of education	5.469	0.361	13.168	0.022
Position	1.748	0.782	2.462	0.651
Department	0.928	0.270	11.801	0.160
Experience using computers	3.185	0.527	4.235	0.375
Competence using computers	6.665	0.083	1.245	0.742
Company	6.830	0.770	12.959	0.961
Size of company	2.383	0.304	1.590	0.452

All the tests performed for the independent variables were the Kruskal-Wallis Anova, apart from the variable gender where the Mann-Whitney U and Wilcoxon W tests were performed. The only significant difference between quality of effective electronic information is gender. There are significant differences between the effect of excessive electronic information and age and education.

Table 5.29: Test statistics of the factors and dependent variables

	Quality of effective electronic information		Effect of excessive electronic information	
Dependent variable	**Chi-square**	**p**	**Chi-square**	**p**
Are you overloaded?	49.964	0.000	61.733	0.000
How long have you been overloaded?	Wilcoxon 4370.000	0.111	Wilcoxon 2560.000	0.419
Has your level of overload increased with modern technology?	0.059	0.809	4.547	0.033
How often do you experience information overload?	5.561	0.135	10.414	0.015
Preferred type of communication	10.563	0.005	6.946	0.031
Why electronic information?	11.847	0.008	12.625	0.006
Why written communication?	2.325	0.508	1.177	0.759
Why verbal communication?	5.933	0.115	4.066	0.254
Searching for a document	41.377	0.000	29.306	0.000
Who can help to minimise information overload?	21.670	0.000	10.836	0.001
What can management do to minimise information overload?	8.398	0.136	7.453	0.189
What can an individual do to minimise information overload?	9.087	0.106	8.603	0.126

Table 5.29 shows that there are significant differences ($p < 0.05$) between both of the factors and some dependent variables. Where the differences are meaningful, they are analysed in the ensuing sections.

5.8.2.1 Comparison of mean rank scores between effect of excessive information and age groups

A Kruskal-Wallis test assessed the differences between the effects of excessive information on each age group (Table 5.30).

Table 5.30: Effect of excessive information against age group using Kruskal-Wallis

Rank	Age	n	Mean
1	60 years and over	18	285.97
2	40-49	125	227.69
3	50-59	48	215.33
4	20-29	85	207.28
5	30-39	145	188.05
	Total	**421**	
Chi-square: 14.981		p=0.005	

The results of the Kruskal-Wallis Anova indicates a significant difference in the effect of excessive electronic information between age groups at the 95% level of significance (p=0.005, p<0.05). According to the comparison of age groups regarding the effect of excessive information, the age group 60 years and over are the most affected (Mean=285.97). Younger aged groups (20-39) are least affected by excessive information they receive at work. This confirms the results presented in Table 5.12 which found higher age groups are more overloaded. Again, the results divert from the study of Cornerstone OnDemand (2012) that found respondents in the age groups below 32 years to be most affected by information overload.

5.8.2.2 Comparison of mean rank scores between effect of excessive information and highest level of education

In order to identify how the effect of receiving excessive information and education level are related, a Kruskal-Wallis test was applied to the factor and the independent variable (Table 5.31).

Table 5.31: Effect of excessive information against level of education using Kruskal-Wallis

Rank	Highest Level of Education	n	Mean
1	PhD/Doctorate	3	338.33
2	Master's Degree	30	267.12
3	Post Matric Diploma	133	217.58
4	University Degree	65	205.73
5	Post Graduate Diploma/Honours Degree	50	203.16
6	High School	140	195.24
	Total	**421**	
Chi-square: 13.168		p=0.022	

The results of the Kruskal-Wallis Anova indicate a significant difference in the Effect of excessive electronic information between levels of education at the 95% level of significance ($p<0.05$). Master's and PhD holders had higher ranked scores than the other groups and thus are more affected by excessive information they receive at work. These results are supported by the findings of Alexander *et al.* (2016) where they concluded that education, especially information literacy, increased information overload. Holders of PhDs and master's degrees would be relied on to perform more information intensive work and hence are more overloaded than others.

5.8.2.3 Comparison of mean rank scores between effect of excessive information and frequency of information overload

The ranking of the recurrence resulting in negative effect of excessive information was achieved by the computation of the mean scores using the Kruskal-Wallis test (**Table 5.32**).

Table 5.32: Effect of excessive electronic information against the frequency of information overload using the Kruskal-Wallis

Rank	How often do you experience information overload?	n	Mean
1	Daily	123	133.80
2	Weekly	91	124.65
3	Monthly	13	101.31
4	Very Rarely	21	83.74
	Total	**248**	
Chi-square: 10.414	p=0.015	n=248	

The results of the Kruskal-Wallis Anova show a significant difference in mean scores between the effect of excessive information and the frequency of information overload at the 95% level ($p<0.05$). This shows that those who indicated they are more affected by excessive electronic information suffer from information overload on a daily basis. These findings fit the findings of Özdemir (2016) who stated that the respondents were unable to cope with the "pollution" in the large amounts of information obtained daily.

5.8.2.4 Comparison of mean rank scores between quality of electronic information and gender

To determine the influence of the quality of information received at work on gender, the Mann-Whitney U and Wilcoxon W tests were performed against the factor and gender (**Table 5.33**).

Table 5.33: Quality of electronic information against gender using Mann-Whitney U and Wilcoxon W tests

Rank	Gender	n	Mean	Sum of ranks
1	Male	232	221.64	51420.50
2	Female	189	197.94	37410.50
	Total	**421**		
Mann-Whitney U: 19455.500 Wilcoxon W: 37410.500			p=0.045	n=421

The results of the Mann-Whitney U test indicate a significant difference in the quality of electronic information between males and females at the 95% level of significance ($p<0.05$). Males have a higher mean rank score than females meaning that the work performance of males is more affected by the quality of information in terms of clarity, relevance and timeliness. Why this is the case is unclear. It can be inferred that at a cognitive level, there is evidence that women are used to paying more attention to detailed information than men and this habit might increase the understanding of the excess of electronic messages (Darley & Smith, 1995).

5.8.2.5 *Comparison of mean rank scores between type of communication, effect of excessive information and quality of information*

To compare the effect of the quality and excessive quantity of electronic information for the three types of communication in the organisation, Kruskal-Wallis tests were performed (Table 5.34).

Table 5.34: Preferred type of communication and quality and effect of electronic information using Kruskal-Wallis

Factor	Rank	Communication Type	n	Mean
Quality of electronic information	1	Written/Printed	36	249.13
Chi-square: 6.946	2	Verbal	49	234.86
p=0.031	3	Electronic	336	203.44
		Total	**421**	
Effect of excessive electronic information	1	Verbal	49	260.04
Chi-square: 10.563	2	Written/Printed	36	226.81
p=0.005	3	Electronic	336	202.15
		Total	**421**	

The results presented in Table 5.34 show a statistically significant difference in the quality of electronic information (p=0.031) and the type of communication preferences. The highest mean rank score shows that those who prefer verbal communication have more problems with the quality of information they receive at work. These results are supported by the findings of Ean (2010) that verbal communication is quicker, more accurate and is best use for understanding a supervisor's instructions compared to e-mail. E-mail was the main source of information in this study (Table 5.5). Respondents preference for verbal communication could be related to a problem with the quality of electronic information they receive.

Similarly, the results indicate a statistically significant difference in the effect of excessive information (p=0.005) and the type of communication preferences. Written/Printed communication type has the highest mean rank score, suggesting that those who prefer verbal communication are more likely to be affected by excessive electronic information. With e-mail being the most used source of information (Table 5.5), employees preferring verbal and written/printed communication might have a problem with electronic information and thus are more affected by the excessive amounts of information.

5.8.2.6 *Comparison of mean rank scores between size of the company, effect of excessive information and quality of information*

Table 5.35 shows the results of the Kruskal-Wallis tests for the two factors relating to quality of information and effect of excessive information on the grouping variable company size.

Table 5.35: Size of company and quality and effect of electronic information using Kruskal-Wallis

Factor	Size of company	n	Mean rank
Quality of electronic information	Small	86	227.67
Chi-square: 2.383	Medium	141	202.43
p=0.304	Large	194	209.84
	Total	**421**	
Effect of excessive electronic information	Small	86	223.23
Chi-square: 1.590	Medium	141	202.66
p=0.452	Large	194	211.64
	Total	**421**	

Both tests were carried out at a 5% significance level. Based on the test results presented in Table 5.35, it can be concluded that no significant differences were detected in both factors and the size of the company (p-values are both greater than 0.05). This means that regardless of the size of the company, the effect of quality and abundance of information is the same on employees.

5.9 KEY FINDINGS OF THE QUANTITATIVE STUDY

It has been argued in the previous chapters that four quantitative objectives, relating to the employees, influence the management of information overload. The findings are presented from those in the literature study and those findings from the empirical study. The empirical research highlighted the following findings in terms of the four objectives: employees' awareness, information sources, effect of information and the level of information overload across companies.

Important findings in relation to each of the objectives are presented next.

5.9.1 Employees' awareness of information overload

Employees suggested that information overload means receiving too much irrelevant information at work and overload occurs when there is not enough time to process the available information. These opinions support previous studies which found that too much information is causing time wastage on the tasks at work and worse, employees are having difficulties to process the available information (Ruff, 2002; Benselin & Ragsdell, 2016).

Employees in the shipping industry are overloaded with information. Based on this study, Indians are the most overloaded with information and Whites the least. Females in Black race group are the most overloaded. This can be linked to black women being previously disadvantaged (Case & Deaton, 1999).

Employees prefer to adjust their own practices to minimise information overload. They proposed that improving their priority-setting practices and improving their information screening skills would help to minimise information overload. However, some employees suggested that it is management who should help to minimise information overload. They advocated that management should develop policies, provide training and introduce technology to help minimise information overload.

Based on the results, it is evident that respondents are aware of the concept of information overload and have an idea of how or who can help in terms of managing it. Therefore, this objective has been met.

5.9.2 Sources of information overload

Modern technology has increased the level of information overload. The data for the questions relating to the sources of information overload show that employees ranked electronic messages as the main reason for being overloaded. E-mail was ranked as the main source of electronic information, confirming the literature where e-mail was perceived as one of the main causes of information overload (Whittaker & Sidner, 1996; Edmunds & Morris, 2000). Electronic information was indicated as the preferred means of communication because it allows for multiple people to simultaneously work on the same document and allows combing multiple media into one document.

Regarding the quality of information received at work, respondents said that they find it easy to understand, clear, concise and timely. This is not the case for the production department, where information is not relevant to do their work. The human resource department complained that the information they receive at work is not on time.

From the analysis of the data, it is clear what the main sources of information overload are. Thus, Objective 2 has been met.

5.9.3 Effects of information overload on employees

In terms of general findings, respondents agreed that an excessive amount of information has a negative impact on their work performance. Employees in the 40-49 year age group are the most affected.

Information overload is affecting employees' well-being. The health consequences pointed out were mental fatigue, increase in stress and eye strain. Suffering from depression and headaches were also reported among managers as a direct result of excessive information that must be absorbed (Farhoomand & Drury, 2002). Some employees indicated that information overload affects their relationships with families and friends.

In relation to time spent managing information, the most time is spent on deciding how to handle incoming messages and communication. Furthermore, respondents said that they prefer electronic documents because it is easier to search for an electronic document stored on the computer or online compared to when it is on paper.

In summary, based on the analysis of the empirical data, it is evident that information overload does have a negative effect on work performance and health. It also has a negative effect on family life.

5.9.4 Comparison of level of information overload amongst shipping companies

There is a high level of employees who are experiencing information overload in all the shipping companies. Small companies experience more overload than medium and large companies. International companies with overseas offices are less overloaded compared to local only companies. One of the reasons for employees in smaller organisations being

more affected could be because small shipping companies have fewer staff and therefore employees normally have varied responsibilities across multi departments (Zetlin, 2015).

In most of the companies, the operations department has the highest percentage of employees who suffer from information overload. Among small and large companies, respondents suggested that with personal adjustment, information overload can be reduced. Among medium companies, half of the respondents mentioned that it is management's responsibility to help reduce information overload. And they suggested that management should offer training on how to cope with information overload.

The findings have shown that there are differences in the different shipping companies surveyed. There findings are compared to the qualitative findings and literature review findings in Chapter Seven.

5.10 SUMMARY OF CHAPTER FIVE

This chapter presented the findings that emanated from the questionnaire data in terms of the quantitative objectives of the study. The objectives of the study were analysed and compared to the literature review. Lastly, a number of relationships were identified.

It is evident that information overload from an employee perspective exists in the shipping industry. Information overload is having a major impact on the respondents' interpersonal relationships as well as on their health. The respondents in all companies believe that as users they need to implement their own methods to improve their information management skills. However, they all stated that management needs to play a role in managing information overload.

The next chapter analyses how management views the existence of information overload and what, if anything, they are doing to minimise its effects on their employees.

CHAPTER SIX

DATA ANALYSIS AND FINDINGS OF THE QUALITATIVE RESEARCH

6.1 INTRODUCTION

Chapter Five, by means of a quantitative approach, presented the employee views on information overload in the shipping industry. This chapter, by using a qualitative approach, presents the views of the decision makers. The data were analysed through content analysis, a methodology used in the social sciences to study the content of communication. The chapter is structured as follows: a description of the interviewees, the coding scheme used to operationalise the analysis, conclusions drawn from the perception of the leaders in the shipping industry.

6.2 DEMOGRAPHIC PROFILE OF INTERVIEWEES

Semi-structured interviews were carried out with subjects regarding their perceptions of information overload. Each respondent had volunteered to be part of the research. All interviews were carried out face to face at the interviewees' offices. Each of the interviews was digitally recorded. The interviews lasted between 17 to 75 minutes and detailed interview notes were taken. Table 6.1 shows the demographics of the interviewees.

Table 6.1: Demographics of interviewees

Company	Size of company	Level of the interviewee	Age	Duration of interview (minutes)
A	Small	General manager (GM)	54	19
B	Small	Director	31	24
C	Small	CEO	45	21
D	Small	CIO	47	32
E	Small	CEO	50	31
F	Medium	CIO	35	17
G	Medium	GM	41	32
H	Medium	CEO	59	29
I	Medium	Chief financial officer (CFO)	58	32
J	Medium	CEO	57	49
K	Large	GM	45	34
L	Large	GM	36	75

The process used for collection is described in the following section.

6.2.1 Reliability and validity

In a qualitative study the data-gathering instrument is frequently the researcher himself. Thus questions of researcher bias and researcher competency, if unchecked, may influence the validity of data considerably (Brink, 1993). For example, depending on how highly structured an interview originally is, it might take almost innumerable directions. This depends on the way the interviewer and the interviewee convey what they want to say, what can or could be said in a particular situation and also on the way this is accepted or understood by the 'other' (Kuzmanić, 2009). Because of the association with the quantitative conceptualisation of the research process, the term validity has generally been replaced by the term trustworthiness within qualitative research (Onwuegbuzie & Johnson, 2006).

To ensure the validity, trustworthiness and reliability of the interview the recommendations by Brink (1993) and Given (2008) were followed:

- The researcher by first built a trust-relationship with the interviewees and with prolonged engagement in the company setting.
- The nature of the research was made very clear to the interviewees. For example, why the researcher is there, what and where he is studying, how the data will be collected and recorded and what he will do with it.
- Detailed and accurate written records were kept in addition to the digital recordings while the interview was being conducted. The responses from the interviewees were sometimes restated to them to make sure there were not variations.
- The final constituent in the interview design process is that of interpreting the data that was gathered during the interview process. The recordings together with the written notes were transcribed as soon as each interview had been completed and was still fresh in the mind of the researcher.

After interview transcription, analysis and interpretation need to take place. These are described next.

6.3 INFORMATION OVERLOAD THEMES EXTRACTED FROM INTERVIEWS

After the interviews had been transcribed, the data collected were coded into themes according to the repetition of words/phrases. Open coding was first performed to quickly retrieve and collect all the text and other data associated with the objectives and research question of the study (Eriksson & Kovalainen, 2008). This was followed by axial coding where the data were put together in new ways by seeking to identify explicit connections between categories and subcategories of data (Creswell *et al.*, 2016). Themes were extracted from the coded text to reflect the themes critical to the objectives and research question. The themes are presented under the respective objective and interview questions in the ensuing sections.

6.3.1 Objective 1: Establish management's awareness of information overload

To establish management's awareness of information overload, the following questions were included for the company leaders:

1. What are the sources of information in your company?
2. Do you know what information overload is? Explain
3. Are you overloaded with information? Explain
4. Who do you believe is most overloaded with information?

The responses were as follows:

6.3.1.1 The sources of information in the company

The sources listed in order of popularity were e-mails, phones/mobile phones, social networks, EDI, walk-ins and meetings, internet and post (Table 6.2).

Table 6.2: Sources of Information

		Company												
		A	B	C	D	E	F	G	H	I	J	K	L	Total
Sources of information in the company	E-mails	x	x	x	x	x	x	x	x	x	x	x	x	12
	Phones/Mobile phones	x	x	x	x	x	x	x	x	x		x	x	11
	Social networks	x	x		x		x		x	x	x			7
	Electronic data interchange			x	x	x		x		x			x	6
	Internet: Websites (Google)		x	x	x		x		x			x		6
	Walk-ins and meetings	x				x		x	x			x	x	6
	Post				x			x	x	x				4

- **E-mail**

E-mail is the most common source of information, as listed by all 12 companies. Findings from Laclavik and Maynard (2009) showed that e-mail is the preferred business communication method. It is utilised for the internal sharing of information between colleagues, departments, and company branches including international branches. A comment made by Respondent F:

> *"We use e-mail mainly to communicate between China and Durban, Johannesburg and Cape Town Office".*

Some of the companies communicate via e-mails to data sources like the port, clients, shipping lines, shipping agencies and customs clearing and forwarding companies. Data received is usually in Microsoft Word, Microsoft Excel, CSV and PDF documents. A lot of magazines like Freight & Trading Weekly are available online and if subscribed are received through e-mails, including newsletters and daily news updates. To express the extent of the wealth of information received via e-mails, Respondent I said:

> *"We get project cargo documentation, bank statements, supplier invoices, tender documents, container depots trackings. Everything comes on the computer. Everything comes via e-mail. We even get FTW (Freight Trade Weekly) on e-mail now. Dynaliner also comes on e-mail now".*

Picking up on one magazine to illustrate the extent of how e-mail allows them so much access to information, Company I went further to say that the information from Dynaliner magazine which they used to get in print via post:

> *"... shows us analytical data on worldwide liner trades. We extract some information and summarise them for the directors of the head office, which is based in Genoa, Italy. Everything comes via e-mail. Any news I want to know about shipping throughout the world. Everything, as I am saying is concentrated on e-mail nowadays. You do not have to go to the post office anymore".*

All companies reported that the majority of the information comes through e-mail. The respondents mentioned they also get information on e-mails even without subscribing to it and there is no subscription cost involved. Not all the information received by e-mail is of use to companies. There is a lot of unsolicited information coming from advertisers. There is also spam coming in and lost e-mails (e-mails not relevant to the company). Internally, there is a lot of information coming through e-mails which are not relevant to specific individuals but there are people with a tendency of just copying everyone in the organisation when they communicate.

E-mails are regarded to be a very cheap communication platform compared to other forms of communication, and therefore they are most popular as one can send vast amounts of information securely, fast and cheaply (Sumecki *et al.*, 2011). In Company B, e-mails are used for almost every communication since all phone calls are followed up with e-mails. Accordingly, Respondent B had this to say:

> *"I would say 90% of our communication in our company is via e-mail. When we have deal in place, then it is 100% e-mail; we use e-mail as a confirmation or almost as an audit log, which cannot be done via normal phone calls. If it is general knowledge, then we use phones; we pick up the phone and ask the customer or supplier. Once we secure orders, then it is exclusively e-mails".*

Whilst e-mail has it pitfalls, it has become the primary means of business communication.

- **Telephone calls**

Phones are the next most common source of information as cited by 11 of the companies. Carlevale (2010) also reported that e-mails, text messages, phone calls, and voice-mails were affecting decision-making in organisations by providing too much information. According to Respondent F, the sales persons and the imports/exports departments have to keep their phones on and with them all the time as there is always communication coming throughout the day. The industry works a lot with international destinations and therefore calls come in even outside normal working hours. They sometimes get requests or share information via phones. This information is then followed up with e-mails in order to have a paper trail for future reference. Messages that come through the phones are usually short, specific and focused.

Due to e-commerce platforms, phone calls have drastically reduced over the past four to five years. According to Respondent D:

> *"We do not receive a lot of requests via phone calls, we hardly call our customers too, but we receive a lot more information on the computer systems, such as our e-commerce tools, and of course e-mails".*

However, respondents mentioned that in Company D, telephones calls are used mainly to communicate between their local branches.

- **Social networks**

Seven companies reported that they use social networks to share and get information. This finding supports those of Burrus (2010) who stated that companies have started to adopt social networking as a way to enhance communication, information sharing, and collaboration. However, the companies specified in this study acknowledged that it is mainly the sales department that use LinkedIn, Facebook and Twitter to advertise the business and to connect with potential clients. Skype is an exception as it seems to be becoming very important, as summed up by Respondent J:

> *"... if you look at Skype, I think this is good for business. Before Skype, communication was not that good, but now it is brilliant for business; we have clients all over the world and we do use Skype quite a bit. We can talk as much as we like to and we can see whom we are talking to. The big thing is a big cost saving for us.*

We have 2 to 3 marketing meetings a week between our Durban, Johannesburg and Cape Town offices. Sometimes our Rotterdam and Shanghai offices are also in those meetings. This is cheaper than flying people across the country or the world just for meeting. The only drawback is with overseas time zones, sometimes you have to wait until 10pm or get up at 4am to have meetings".

Through Skype, it has become affordable for companies to hold more meetings with their counterparts and clients. A meeting is a very important source of information for companies. Minutes are usually documented and shared for future reference. Respondent D shared a similar sentiment.

- **Electronic data interchange**

Half of the companies explained that their organisation's computer system allows them to send and receive direct communication in the form for electronic data interchange (EDI) to and from external sources like the sea terminals, customs offices, shipping agencies and customers. According to Respondent I:

"I am also getting all computer program messages. For example, we get EDI messages from our computer programs for the operations of the vessels, container depots, etc. And so I am getting all that information and messages from the port of Durban. I also get messages from the customs offices".

Large volumes of information come through the EDI which can process some of the information, as explained by Company L who said:

"... our computer systems generate a lot of different reports that are used in the different departments. These are management reports and operation reports. There is also now, operational information coming electronically from the Durban port and our agencies across the globe. For example, container movement, container discharges from the ship. We do even get the invoices from our suppliers and bank statements that are automatically loaded onto our computer system".

This was also echoed by Company D who explained that there is a lot of information from a variety of sources that feed into the EDI. Respondent D explained that:

"... the IS/IT departments have EDI (Electronic Data Interchange) from Transnet Port Terminals and customs, systems messages generated by our computer systems, summary reports from our internet service providers, exception reports from our local ERP shipping software, reports from our e-commerce sites, messages from TPT NAVIS terminal operating system, and so on".

In the case of Company E, the directory of contacts from the Perishable Product Control Board is what they use extensively to contact and communicate with their existing and potential customers. EDI is clearly becoming a key technology in the shipping industry (Ang, Tahar & Murat, 2003).

- **Walk ins and face-to-face meetings**

Face-to-face meetings were also cited as a source of information. Only half of the companies said that they hold meetings to share information. Face-to-face interactions are on the decrease as a result of electronic messages (Benselin & Ragsdell, 2016). Meetings are held internally between colleagues and with clients. One-on-one meetings with employees and clients are also held. The information is documented and placed on shared folders for easy access by the relevant persons. Respondent L said:

"... the team meetings help to convey the information more effectively. Secondly, it provides an opportunity to build team spirit when you talk about things and it builds trust. ... it is a collective forum to hold managers accountable, which will help, build trust. And finally, if people are not performing, in the team that gives him or her opportunity to raise it up in the meeting. And the one-on-one meeting filter into that. Sometimes, people do not want to talk openly in a public forum, they are natural introverts, it is quite a sensitive topic and they prefer to discuss it with their manager. I actually have one-on-ones with my senior managers every month. One-on-one monthly makes sense for everyone. We have operational teams meetings once a week, and senior management teams every second weeks to be able to facilitate decision making and information sharing".

In Company E, sales representatives go out to visit customers and upon return, prepare visit reports for managers. Meetings are a very important source of information for

Company K and they have many kinds of meetings for different purposes. Respondent K explained that:

> *"The meetings are varied across the business, you have meetings where you are discussing concepts and trying to understand whether you go forward with them. Then there are meetings in terms of decisions that have already been made in terms for certain concepts, which are becoming projects. So, it is getting clarity around it, it is the scoping of it. It is also about the ones currently on the run, where we have meetings to get status on how far you are, what are your requirements, do you need directions. These are primarily the key things in the meetings".*

Meetings are not as widely popular as e-mail as source of information; however, they are still very popular among businesses. For example, van Knippenberg *et al.* (2015) reported that almost 50% of employees' time is spent on meetings, administrative tasks, interruptions, and managing e-mail.

- **The Internet**

According to 50% of the companies, they use the Internet as a source of information. Company F explained that they use their website to share information including folders and documents. According to the respondent:

> *"We also use our website as a means of communication and share folders between our three offices".*

In addition, customers and potential clients send enquiries, follow up on orders and submit comments on the websites. Google is also used as a source of reference if there is any gap in knowledge. According to a respondent, there are large volumes of information freely available on the Internet and they access it. They also download most magazines on the Internet and send out enquiries to companies of interest to explore opportunities.

Other information that is freely available on the net includes exchange rates, economic news, trade patterns and predictions, and weather updates.

- **Post**

A third of the companies cited the post as one of their sources of information. According to them, there are certain hard copies of magazines which they receive through post. Most companies that send hardcopies by post are also e-mailing the documents, implying that they are transitioning to e-mailing of magazines and documents.

> *"We can go once a week to the post office and there might be 1 envelope sitting out there. And I do not know why these companies put in post and send it to us because they also e-mail it to us. All sorts of information in your company - 99.9% of information are e-mail"; Respondent I.*

A similar view was echoed by Company D who also explained that the only post which they receive is the FTW but they also receive the same magazine in electronic format via e-mail. In some instances, they also receive invoices and proof of payments by post from clients.

6.3.1.2 The understanding of information overload

Respondents acknowledged that they knew what information overload is. They defined information overload in terms of quantity of information that is available on a specific subject. According to Respondent C, information overload refers to a scenario where:

> *"... there is too much information regarding that specific subject. ... there is too much information for a human to absorb on a given subject".*

According to Respondent G, there is a large volume of information which is a mixture between relevant and irrelevant information. As explained by Respondent G, some of the irrelevant information includes promotions, advertising and reports that are of no real value to the organisation.

> *"In my opinion, information overload is when there is a lot of information or data that you are processing and not all of it is relevant. So, you have a lot of peripheral information that is interesting to know, but you do not need it to make the decision. So, it clouds, or it can cloud what you are looking at. Because suddenly, you have a lot of information that ... it is just, like too much information. It is not focused. It could be relevant, but does not have a bearing of the ultimate decision. Basically, in*

my opinion of what information overload is when there is too much information and that need to be filtered".

This information can be available in different formats and on different platforms. There were those that defined information overload in terms of the information that is received through e-mails. According to Respondent I, there is too much information that is received via e-mails which may be relevant to the company but not specifically to all the persons that are copied in the e-mails. However, because the person sending the information includes everyone on the distribution list, it adds to the junk information that unnecessarily overwhelms recipients with information. Thus, in order to get to the relevant information, there is a lot of filtering that is required.

There are also scenarios where e-mails get lost and end up in the inbox of certain people – with information that is completely irrelevant to the company or the individual. According to Respondent J:

"I get copied on literally on every single thing. And somebody sometimes just see your e-mail and they are directing the e-mail to you. I mean, I get a company directing an e-mail to me, why the ship is not discharging in wherever they are fighting, in Beirut or those areas. Because somewhere they picked your name up, and they are asking you for explanation. Now you also getting wrong e-mail directed at you instead of the correct person because they are finding a name that's listed in a previous e-mail".

It was also noted that information becomes an overload when it disturbs the productivity and functionality of a person. According to Respondent A, information overload is

"...receiving so much information that you do not know what to do with that information or you become inactive because you are bombarded with so much information".

According to Respondent D, it becomes information overload when employees cannot finish their work in the presence of excessive information which results in them getting stressed. In a nutshell, all the participants explained that information overload is through e-mails. For example, Respondent J had this to say:

"But there are still too much information coming to me on e-mail. I am speaking for myself; I do not have time to read it all. I have to be selective of what I read. For me information overload is getting too much information coming through e-mail".

All 12 interviewees recognised information overload by citing having too much information, irrelevant information, affecting productivity and increasing stress. All these definitions and terms were specified in Chapter Three (Section 3.3.1) where information overload was defined.

6.3.1.3 Who is overloaded with information?

Table 6.3 shows the company leaders who are overloaded with information together with which departments in their organisations they believe are overloaded with information.

Table 6.3: Who is overloaded with information?

Company	Interviewee overloaded	Departments overloaded
A	GM	All
B	-	Sales & Marketing Accounts
C	CEO	-
D	CIO	Operations (Freight) Accounts
E	-	-
F	CIO	Sales & Marketing Operations (Imports)
G	GM	-
H	CEO	Operations (Freight) Production (Container)
I	CFO	Operations (Import & Export) Human resources (Procurement)
J	CEO	-
K	GM	Customer services Human resources IT
L	-	No departments are overloaded

Of the 12 company leaders that were interviewed, 75% reported that they are overloaded with information (Table 6.3). When asked to explain their responses; varied responses were received.

According to respondents, the shipping industry is evolving and therefore there are new laws, rules and regulations that are constantly coming into place. To keep up, there is a lot of documentation that one needs to constantly study to ensure that the company is adhering to the standards. According to Respondent C:

> *"Regarding my company or my industry, there is too much information out there. And with the trend now, new laws, like SOLAS (The International Convention for the Safety of Life at Sea) that came into effect; that is affecting us on a daily basis. Shipping rules and regulations that are in place, company change over as well. That impacts us".*

For those companies that have branches in other cities and overseas, there is further documentation that relates to upgrades and standardisation of processes like container repairs procedures and this increases the amount of EDI. Thus, information relating to procedural activities or process systems sometimes tend to overwhelm respondents. This was supported by an example that Company F cited:

> *"Process Systems...needs to be captured within so many hours. So, I need to monitor that closely. Our operations department vessels, we need to do sundry reports for the principal at a specific time after the vessel; when it arrives, when it departs. Then there is equipment control; we need to monitor equipment control and make sure that events are getting updated on time and tracking of the containers and stuff. So, I am involved in all those processes and I am monitoring very closely on a monthly basis. ... we get the information, we have to download the information; filter it and monitor it on a weekly basis so that we can reach our targets for the principals".*

According to Respondent D, there are periods when information overload is high especially when they have vessels in the ports. During such periods, they must read and respond to e-mails almost immediately to avoid heavy penalties from the port authorities. The IS/IT systems have to be ready and a lot of information has to be processed, a lot of research conducted on new technology and so forth.

Company L reported that they used to be overloaded, but not anymore because:

"... as an organisation, we spent a lot of time and effort reducing the e-mail burden that people have. Then they have more time to do other things which then in turn I think reduces their stress levels as they are not worried about their inbox, they are more worried about getting their work done. Just as an example, we went from 830000 e-mails per month to 230000. It looks like 65% to 70% reduction per month in two years".

6.3.1.4 Who do you believe is most overloaded with information?

When the company leaders were asked to specify who in their organisations were overloaded with information, specific staff members and departments were listed (Table 6.3). Company A was the only company that cited that all staff members across all departments in the organisation are overloaded with information.

In Company C and Company J, only the CEO is overloaded as he must deal with new rules and regulations, adhering to standards stipulated by head offices overseas and dealing with information from the EDI systems. Thereafter, he directs information to relevant departments and therefore in his view, the departments are not overloaded.

According to Respondent F, the CIO and the staff in the imports department and those in the sales department are overloaded with information. In Company G, the general manager and the senior management are the ones overloaded with information because they are copied in all communication to keep updated with everything that is happening in the company. These are mainly the general managers, assistant managers and accounts managers.

On the other hand, in Company H, the CEO and staff from the freight desk and container department are overloaded with information, while in Company I it is the CFO and the imports/exports department (Table 6.3). According to Respondent D, the CIO and the freight department are heavily overloaded with information. In explaining the extent of the overload on the freight department, he said:

"I would say the freight department. Because the ships are coming in and out, the staffs have releasing to do, they have to worry about all the computer systems where

they need to capture information, such as local ERP shipping software, overseas head office e-commerce systems, TPT (Transnet Port Terminals) NAVIS computerised system, and answering queries about customers' cargo. The freight guys get e-mail from the principal (overseas head office), from customers, from customs, from their managers, from TNPA (Transnet National Ports Authority), TPT (Transnet Port Terminals), … And they need to process all this information and do it in a day. It is not as if they can leave it for another day".

Respondent D also listed the accounting department as being heavily overloaded with information as they need to process information coming through from suppliers, banks and debtors. The information comes via e-mail, printed supplier invoices, bank statements, debtors' payment confirmations and also EDI. They gather all this information and process it into reports for managers and principals overseas. In Company B, it is the sales and accounting departments while in Company K it is the customer services, HR, procurement and IT departments that are overloaded with information.

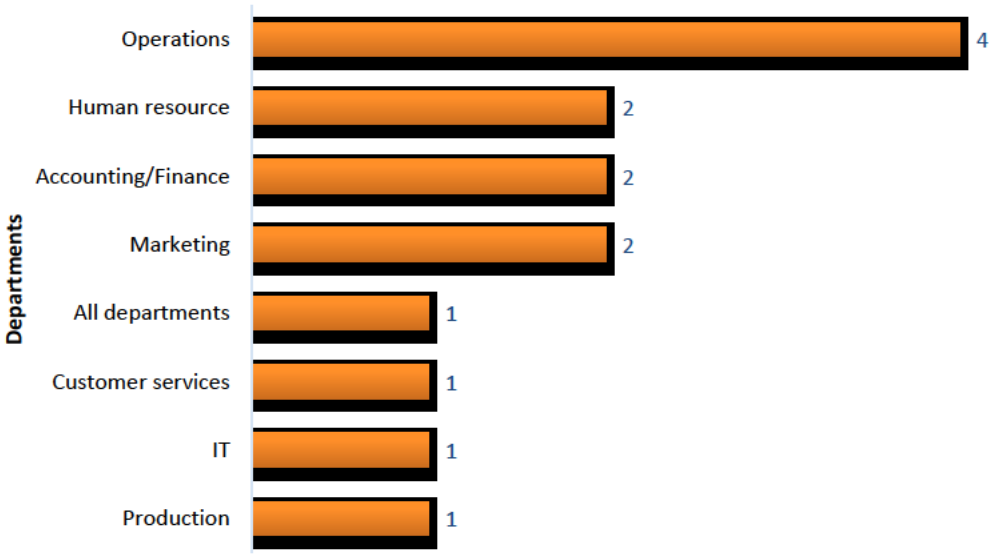

Figure 6.1: Summary of departments overloaded by information

Figure 6.1 shows that the departments responsible for operations (freight and import/exports), human resources, marketing and accounting are more commonly listed as more overloaded with information. The reasons given by management regarding why the operations department is more overloaded are as follows:

- Ships arrive at and depart from port at specific times and the operations department is required to submit information to the head office and the port at specific times based on the activities on the port.
- Empty and full container movements need to be monitored in real time. A lot of information comes from the port, depots, importers and exporters to monitor these containers.

Respondent D indicated that middle management are more overloaded with information as they receive the raw information and summarise it into reports that are then submitted to the executives.

6.3.1.5 Summary of Objective 1

All the interviewees identified e-mail as the main source of information used in their organisations. The second most used communication was phones and mobile phones. Among the company leaders, there is a clear understanding of what information overload is. They defined information overload as having too much information on a subject to the extent that it is difficult to absorb the information or put it to effective use. Some interviewees suggested that information overload occurs when the volume of information is so high and a lot of time is required to filter the relevant information before it can be used.

All the company leaders apart from one reported that they were overloaded with information. Thus, in most of the companies, it is the management and the staff in the operations, human resource, sales and marketing and accounting and finance departments that are usually overwhelmed by information. Junior staff in other departments are rarely seen by management to be overloaded with information.

6.3.2 Objective 2: Evaluate how companies are managing information overload

Interviewees were asked the following four key questions in order to understand how they are managing information overload in their organisations:

1. What role is modern technology playing in information overload of staff, yourself and the company?
2. What is your company doing to manage information overload?
3. Does your company have any initiatives in place to help staff who are overloaded with information?
4. Do you have any support programmes to rehabilitate staff whose health has been affected by information overload?

6.3.2.1 The role of modern technology in information overload

Of the 12 respondents, the majority (83%) reported that modern technology has worsened the burden of information overload on staff, management and the company (Table 6.4).

Table 6.4: Role of modern technology in information overload

		Company											
		A	B	C	D	E	F	G	H	I	J	K	L	Total
What role is modern technology playing in information overload?	Worsened overload	x	x		x	x		x	x	x	x	x	x	10
	Relieved overload			x			x							2
	Increased information overload													
	Data is cheap and easy access to modern technology	x	x		x	x		x	x	x	x		x	9
	People reachable all the time	x				x		x	x	x	x		x	7
	Automated generation and distribution of information				x			x	x		x	x	x	6
	Easy access to people's personal information for distributing information		x		x	x			x		x		x	6
	Information sharing is cheap and effortless		x					x		x	x		x	5
	Subscribing to information is cheaper/free	x	x					x			x			4
	Necessity to receive real-time immediate information	x						x			x		x	4
	Easier, cheaper and real-time generation and distribution of information					x			x		x		x	4
	Conference calls and skype allow regular meetings										x			1
	Total	**4**	**4**		**3**	**4**		**6**	**5**	**3**	**9**	**1**	**7**	
	Reduced information overload													
	Format of data more usable, convertible						x	x				x	x	4
	Generation of reports easier							x				x	x	3
	Eliminates human error			x			x						x	3
	Filtering software							x					x	2
	Total			**1**			**2**	**3**				**2**	**4**	

The main theme that was extracted is clearly related to the findings by Velez (2008) who stated that modern technology has made it possible for organisations to get more data, faster, and with more detail than ever before. Furthermore, modern technology has contributed to information overload by accelerating production of new information, easy and cheap duplication, storage, and facilitating easy generation and dissemination of information (Strother *et al.*, 2012). The popular themes extracted from the interviews are presented next.

- **Data is cheap and access to modern technology has increased**

There is a general consensus that cheap technology and cheaper connectivity costs are exposing people to more information than they can handle, resulting in information overload. For example, according to Respondent D:

> *"Now it is even easier to be more consumed by work with cell phones. Now you do not even need your laptop, everything is on your cell phone, which is easier to carry and light in your pocket".*

- **People reachable all the time**

Close to two thirds of the respondents reported that invention of mobile phones and laptops has removed the culture of confining work communication to office hours. Almost everyone is reachable on their phones for voice communication and e-mails. Modern technology has changed the communication field. One does not have to wait for office hours to receive work-related communication. Three quarters of the respondents expressed a concern that all the time, namely office hours, at night, weekends and holidays, they are continuously bombarded with information from their subscriptions, advertisers, and so forth, through e-mails, cell phones, social networks and the Internet. In explaining the impact of technology on being bombarded with information all the time, Respondent A said:

> *"... you expect technology to make your life easier, that is not necessarily the case because now not only do you while you travelling you get information on your cell phone on your laptop, you're getting information all the time. Whereas before if you are travelling, then you would not have access to all that".*

- **Automated generation and distribution of information**

Half of the respondents highlighted that modern technology has advanced to such a level that systems have been put in place that are automated to collect data, process it and distribute to subscribers. Consequently, there is much relevant information coming in continuously through e-mails, and computer systems. Respondent L had this to say:

> *"Our computer systems generate a lot of different reports that are used in the different departments. … There is also now, operational information coming electronically from the Durban port and our agencies across the globe. For example,*

container movement, container discharges from the ship. We do even get the invoices from our suppliers and bank statement that are automatically loaded onto our computer system".

There is pressure to read the reports and act as the bulk of the information is important to the successful running of the business, especially when the information deals with the competitors, oceans and the weather. Respondent J explained:

"We get the Alpha communication, which tell us, which companies are making losses, which trade routes are making losses, the problems they have around the world in terms of volumes changing. … The good thing of getting information is that it pre-warns you of what could happen or not happen".

- **Easy access to people's personal information for distributing information**

Over the years, social networks have grown significantly and a lot of personal information is available to advertisers. According to Respondent H:

"People are very clever. They pick up my name on the internet, they send me direct e-mail and they say: "can we get together for a cup of coffee?". And when you read the e-mail, you found out that you never knew that person. They're just trying to get your attention".

Respondent G complained about receiving promotions, advertising and irrelevant reports daily. Thus, advertisers are also continuously on the lookout to harvest contact information and distributing their adverts. This was reported by Gross and Acquisti (2005) when they mentioned that it is possible for somebody's profile to be connected to hundreds of peers directly, and thousands of others through the network's ties which allows for personal and often sensitive information to be freely and publicly provided. On the other hand, there are those gathering the information and selling it to advertisers. According to Respondent H:

"So, it's not just a matter of going out and meeting people when you canvass the cargo, you've got to do other things - we go onto social media. So, we're advertising using Google ads, Face book, Instagram ... We probably get about 2 million hits a month on Face book".

Therefore, much unsolicited information from advertisers and scammers is also coming in; which needs processing. Company H added that technology has made it easier to deliver unsolicited information to e-mails, phones and on social media platforms.

- **Information sharing is cheap and effortless**

Due to technology advancement, sharing information takes as little effort as just forwarding an e-mail or forwarding an sms or a link. There is no additional cost in forwarding an e-mail or document to hundreds of people on a distribution list compared to the past when one would have to print, package and take information material to the postal service. It is almost effortless and free. According to Respondent L:

> *"... it is so easy to share information so quickly and widely. Because now I can just say, I can send this to 300 people in 2 minutes. So, duplication of messages is so easy too. Because it is so easy, people say let me add everyone just in case. People are not actually considering their audience and whom the messages are tailored for. What they are saying is that I want to make sure that everything is covered so let me send it to everyone".*

Even if one needs to alter the message, it is a matter of cutting and pasting and making a few adjustments. According to Respondent G:

> *"We did not have cell phones, we did not have e-mails, and data processing was on pieces of paper with squared blocks on it. And if you made a mistake, you have to scratch it out and start over. These days, you cut and paste, change formulae. Everything is immediate".*

Five of the respondents mentioned that easy and cheap information sharing has increased information overload in their organisations.

- **Subscribing to information is cheaper/free**

In the past, it cost money to subscribe to certain sources of information. However, these days one can subscribe to groups on social networks and other sources of information for free. This has resulted in people receiving a lot of information, both relevant and irrelevant. Respondent B explained:

"I would say if you are subscribed to certain groups, it will by all odds add to information overload. I know that by experience, I am subscribed to a lot of groups on LinkedIn, which are all business groups linked to shipping. But there is quite some nonsense going out there too. So, I would say I do get quite a bit or information from social media as well".

- **Reduced information overload**

Five of the respondents explained that technology has also in one way or the other reduced information load. For example, three of the interviewees, mentioned that modern technologies have allowed data to be better formatted and presented. Data are now in formats that are easier to process, manipulate and convert. Some respondents also mentioned that modern technologies have allowed for easier report generation. For example, Respondents C mentioned that their shipping computer software produces management reports in seconds compared to days when it was done manually.

Some of the companies have installed software to ensure that unsolicited and irrelevant information is filtered out of their networks. Such information includes spam, adverts and pop ups. Respondent L explained that:

"... technology is actually helping to reduce information overload because now we can get better reports. We can get reports and information in a more usable format, which helps us make better decision. So instead of having to get from multiple sources, we can now get it in one place. So, technology is both that it worsens information overload and it can also reduce overload".

Furthermore, technology has greatly reduced information overload in some companies where the IT department has installed preventive software to control internet access.

6.3.2.2 Managing information overload

Interviewees were asked to explain what their company is doing to manage information overload (Table 6.5). Only one of the 12 companies, Company J, reported that they were not doing anything. The reason given for doing nothing was that no-one has complained about information overload and therefore each person is dealing with it in their own way.

Table 6.5: How companies are managing information overload

		Company												
		A	B	C	D	E	F	G	H	I	J	K	L	Total
What is your company doing to manage information overload?	Outsourced IT services to specialists/Have IT department	x		x				x			x	x		5
	Restrictions in access to certain websites						x	x			x			3
	Training on handling information	x							x			x		3
	Information folder on the intranet		x		x									2
	Monitoring e-mail volumes against productivity					x							x	2
	Change in communication culture											x	x	2
	Group e-mail box				x								x	2
	Discourage leisure browsing during work		x			x								2
	Reduce meetings	x										x		2
	Continuous assessment of distribution lists												x	1
	Nothing									x				1
	Total	**3**	**2**	**1**	**2**	**2**	**1**	**2**	**1**	**1**	**2**	**4**	**4**	

It is evident that whilst there are solutions available to minimise information overload, most of the companies are doing very little to manage information overload. The two large companies are doing the most to decrease information overload. However, except for changing the communication culture, there is not commonality in the solutions that they have implemented. Outsourcing was common among five of the companies. For example, according to Respondent D:

> *"We have also introduced Mimecast triple threat protection on our e-mail servers. Basically, Mimecast scans any unwanted messages, and if it finds a threat, it throws it into a spam box and sends the recipient a message asking the recipient for confirmation before opening. It is up to the staff member to decide whether he wants it or not. We have eliminated a lot of spam e-mails by using Mimecast".*

Respondent K talked about outsourcing to external consultants to help alleviating information overload:

> *"We engage consultants to help structure and focus the staff in terms of and how to work with certain information, and how to generate information that is needed by management".*

Only three companies stated that they impose restriction access to websites and only two companies said that they discourage leisure browsing. This "freedom" allowed to employees can result in self-imposed information overload on employees.

Monitoring the volume of e-mail received against employee productivity would give management a clearer picture of the impact of the main "culprit" e-mails on staff productivity. However, only two companies, one small (Company E) and one large (Company L), said they were doing this. For instance, according to Respondent L:

> *"When I took control of managing information, I informed all staffs that we are not now measuring e-mail volumes. So, people knew we need to change the way we do things. I requested statistical reports from our e-mail service provider via our IT department on e-mail volumes monthly".*

In Company L, e-mail volume monitoring has reduced volumes by about 65% over a period of two years – from 830000 e-mails to 230000 per month.

6.3.2.3 Initiatives provided by companies to help staff who are overloaded with information

All the companies that were interviewed reported that they do not have any initiatives in place to help staff who are overloaded with information. Respondents reported that none of their staff had come forward to report the challenge and therefore, even though they acknowledge that staff may be experiencing information overload, no initiative is in place to address that specifically.

Since there are no regulations or legislation around information overload, companies are not obliged to put any initiative in place. According to Respondent L:

"So, companies are not going generally to do things like this, unless there is regularity or legal requirements. So unfortunately, this is how companies operate; they are not going to deal with it unless they got a gun to their head. Unfortunately, people on top only know a certain way and they will only listen when there are regularity requirements, or we are forced to do ... This is an old-school type of corporate community".

However, information overload is one of those challenges that has not been fully defined. Research in the focus area is still young and therefore there has not been any advocacy around that. Some of the employees may not even be aware that there is such a challenge. Labour legislation has not yet picked it up and thus it is not necessarily a legitimate problem that needs to be dealt with in business or in society.

However, as the challenge is becoming more and more common, as technology continues to improve and result in increasing information overload, workplaces are becoming compelled to recognise and acknowledge it. According to Respondent L:

"I think that is something that labour legislators needs to start looking at. But again, it is one of those things, do we need to legislate something that has not got a business need in it".

Even though the companies reported that they did not have any initiatives in place designed specifically to help staff overloaded with information, they had initiatives for other workplace challenges that could assist those overloaded with information. Symptoms of information overload includes stress (Wilson, 2001; Zhuang *et al.*, 2011). Most of the companies reported that they have programmes to support employees who are stressed at work. Respondent A:

"... we do have support programmes. Once again, we have a third-party company that assists staff when they are feeling stressed or anything stress related. So, I think this would fall under that. So, it depends on the scenario to scenario basis. We tend to support our staff with whatever issues they may have so as long as management is aware of the issue and staff brings it to their notice then the correct action can be taken".

When new staff members join the organisation, they go through a workplace orientation programme to familiarise themselves with the new working environment. Certain components of the programme are aimed at equipping staff with information handling and processing skills which includes basic e-mail management courses, introduction to shipping software and time management. According to Respondent H:

> *"There is a lot of training that goes on. It is mainly on the job. We also do lot of external training also through the institute of chartered shipbrokers association. … Even the accountant and the receptionist are put on shipping course. … Everybody must have to know something about shipping… "*

Respondent H is more concerned with work overload than information overload. Respondent H:

> *"If I see somebody not coping with the work, then we need to re-distribute the work"*.

There was no specific initiative to help staff who are overloaded with information. However, most respondents indicated they believe that on-going training on shipping and information management coupled with support from IT and HR departments can help staff who are overloaded with information.

6.3.2.4 Support programmes to rehabilitate staff whose health has been affected by information overload

Respondents were asked if they had any support programmes to rehabilitate staff whose health has been affected by information overload and to explain their responses (Table 6.6).

Table 6.6: Support programmes to rehabilitate staff whose health was affected by information overload

		Company												
		A	B	C	D	E	F	G	H	I	J	K	L	Total
Support programmes to rehabilitate staff	No	x	x	x	x	x	x	x	x	x	x	x	x	12
	Encourage good office ergonomics practices						x	x	x	x				4
	Training programme	x					x					x		3
	Support programmes to deal with stress	x							x			x		3
	Redistributing work				x	x							x	3

None of the respondents reported that they had any support programmes to rehabilitate staff whose health was affected by information overload. This is because no staff members brought it to management's attention that they were overloaded with information and that it was affecting them. For example, according to Respondent L:

> *"No. we do not, because we never identified any one that has been affected, especially health wise, from information overload".*

Similarly, according to Respondent J:

> *"None of my staff ever complained about being sick due to information overload or even too much work".*

However, there are some initiatives in place that can benefit those being affected by information overload even though they are designed for other workplace issues. For instance, Respondents F, J, H and I recommended encouraging good office practices. Respondents D, E and L suggested redistribution of work which can help staff members who are affected by information overload.

6.3.2.5 Summary of Objective 2

Modern technology has worsened information overload. This is mainly because generation, distribution and receiving information has been made easier, quicker and cheaper by modern technology.

The concept of information overload in the workplace is fairly new in companies in South Africa. It has not yet made its way into labour legislation and labour advocacy. Currently, there are no indicators for diagnosing it or guidelines for dealing with it. Therefore, companies have no initiatives in place to help staff who are overloaded with information. No staff members have reported that they are overloaded with information and therefore the issue is not a top priority. However, some HR programmes can support those who are stressed. These include office ergonomics practices, employee wellness programmes and training.

6.3.3 Objective 3: Determine the impact of information overload on companies

To determine the impact of information overload on companies, the company leaders were asked to specify what they viewed as consequences of having too much information (Table 6.7).

Table 6.7: Consequences of having too much information

		Company											
		A	B	C	D	E	F	G	H	I	J	K	L	Total
Consequences of having too much information	**Negative consequences**													
	Time wasting	x	x			x			x	x			x	6
	Productivity negatively affected		x		x	x							x	4
	Confusion			x				x				x		3
	Negatively affect family time			x		x				x				3
	Inability/delay to make decision and taking action	x						x				x		3
	Getting wrong/inaccurate information							x						1
	Just an irritation										x			1
	Stress				x									1
	Total	**2**	**2**	**2**	**2**	**3**		**3**	**1**	**2**	**1**	**2**	**2**	
	Positive consequences													
	Assist in predictions										x			1
	Information is always available				x									1
	Sales & Marketing		x											1
	Total		**1**		**1**						**1**			

6.3.3.1 Negative consequences of information overload

Eight negative consequences of information overload were identified by the interviewees. No new negative consequences have been identified to what has already been established in the literature. However, not many of the interviewees could identify more than three negative consequences.

Half of the respondents reported that information overload wastes a lot of company time. According to Respondent H:

> *"Probably one of the biggest time wastage is deleting e-mail that you did not need to receive in the first place. It is absolutely a waste of time".*

According to Respondent I, she has to extend her workday to go through the e-mails before starting with office work.

> *"So now, I actually start work at 7 to get all these e-mails read and sent off to whomever I need to send stuffs before I even start off with the banking... Now I have*

an I-phone; all my e-mails are coming through there. So, I find that now I am reading them when it's weekend, or at night or am deleting stuffs before I come to work".

Even during weekends, Respondent I has to use her spare time to sift through e-mails.

Having to sift through loads of information to filter relevant information takes employees away from their productive activities. Respondent L explained this:

"I think productivity takes a serious knock and effectiveness as an organisation is drastically reduced. People were spending at least one hour and a half each day to manage inboxes. Now if you add that over a team, that is probably 3 head count. Now you can quantify that ... But if you have that extra one and half hour a day, you can actually manage the projects and enhance your productivity".

Also, social networks lure employees from concentrating on their work. According to Respondent E:

"Staff have their Facebooks, and so on, and they are busy during office hours doing private non-business stuffs… all of these are non-business related… It is difficult to put your finger on it and say this is personal or business. It is a problem which I need to address".

When an employee is busy on their mobile phone, it is difficult to determine they are busy with personal things or with work-related matters.

6.3.3.2 Positive consequences of information overload

There are three advantages of information overload according to respondents B, D and J.

- **It assists in forecasting and making predictions**

In order to make better predictions of the weather, forex and trade decisions, a lot of information is required. According to Respondent J:

"... the good thing of getting information is that it pre-warns you of what could happen or not happen. You put plan B or C in place if this happens or not happens".

- **Information is always available**

It is easier to access information anywhere and cheaply. One does not have to go looking for information as information comes directly to their computers and their phones. According to Respondent D:

> *"I think there might also be an advantage; you do not need to go and look for that information. I like to have the information right there when I need it, as long I can find it easily. In certain cases, it is easier to sift through saved e-mails than to search for new information on the internet".*

- **Sales and marketing**

Respondent B was of the view that lots of information is important for the purpose of marketing and sales. These normally feed into strategy development.

6.3.3.3 Summary of Objective 3

Information overload has more negative consequences than positive. The negative consequences include wasting time and reducing employee productivity since more time is spent on processing information. This also delays decision making and consequently delays action. Sometimes the freely available information is unverified especially that from Google and might result in wrong decisions. Information overload may lead to stress. It also disrupts staff from spending quality time with families, especially when e-mails are redirected to the employees' mobile phone. On the other hand, the more information the better for those responsible for predictions and forecasting. For those in marketing and sales, more information improves the accuracy in profiling clients and target markets.

6.3.4 Objective 4: Establish guidelines for good practice for managing information overload

The company leaders were asked to specify what they would consider as good practice to manage information overload. The themes extracted are summarised in Table 6.8.

Table 6.8: Good practices to manage information overload

		Company												
		A	B	C	D	E	F	G	H	I	J	K	L	Total
Good practices to manage information overload	Prioritise information	x		x	x	x	x	x	x		x	x		9
	Specialist IT services			x	x			x		x	x	x		6
	Training							x	x		x	x		4
	Sort work into folders	x	x	x										3
	Develop communication culture					x						x	x	3
	Restrict receiving work e-mails on cell after hours										x			1
	Regularly check if there is information overload					x								1
	Total	**2**	**1**	**3**	**2**	**3**	**1**	**3**	**2**	**1**	**4**	**4**	**1**	

- **Prioritise information**

Three quarters of the respondents cited prioritisation of information as good practice to manage information overload. According to Respondent D:

> *"I would say, firstly tackle all your top priority information and attend to lower priority ones later. Basically, it is prioritising your day-to-day function and prioritising your e-mail information".*

This process requires one to have a good and clear understanding of their information needs and information sources. For instance, a quick scan through the e-mails would enable one to decide which ones to open first, which ones to archive for later review, which one to delete as well as which ones to forward and to whom.

In support of this sentiment that one should prioritise certain sources of information over others, Respondent J emphasised the importance of being able to prioritise information by saying:

> *"I must say it is our policy in shipping, not only in our company, that mail must be answered almost immediately. Because in shipping, if somebody asks you for a freight rate, … you have to reply immediately because you have another 20 to 30 shipping lines there. And if you sit with the inquiry and do not reply, you have the*

other lines that are going to reply. The advantage that we have, and why we are so successful, and that's what we get from our client, that we are one of the very few companies that when requests are made for freight rates or schedules for the vessels, we are the first to respond. And that is the success of our company. And it is so competitive out there and we are against the big companies like MSC, Safmarine, COSCO and so on... So, when it comes to that, any mail from the principal has to be replied to immediately".

- **Experienced and resourced IT services**

According to half of the companies, it is important to have well-resourced IT services. Some of the companies outsource the function while others have their own internal department. According to the respondents, IT specialists should help and support information filtering, censoring and prioritising. For instance, Respondent G suggested that:

"I would say censoring what you are reading or what information you have. Filtering and prioritising. And possibly even rejecting certain information".

In addition, Respondent G said:

"We are putting in place is the spam filter. The spam filter is a start for our organisation".

However, the IT specialists should understand the company's information needs and information sources. This would assist in putting IT systems in place to filter information, censor information and help to prioritise emails.

- **Training and support**

It is important for staff to understand their work so that they can perform an effective information search. According to Respondent K:

"If you know what information you require, then you also know upfront whether you have it or you don't have it. So, you are not spending time trying to figure out if you have the right information. The sooner you know you got it or you don't then you start making your requests to the different parties to get that information. It is about knowing exactly what you need to do your job and it is part of a process which is part of the structure which is about how you go about to do your job".

Similarly, in Company H, there are monthly internal seminars focusing on training, networking, and team building. In these seminars, all aspects of shipping or shipping-related matters are covered.

- **Communication culture and information overload monitoring**

It is important for organisations to assess their communication culture to ensure that it does not promote information overload. For instance, Respondent E had this to say:

> *"And as there is a lot of information available these days, try to channel the right information to the specific staff member relating to his job function".*

Furthermore, Respondent J stated that in his organisation, they try to limit electronic communication to office hours only. However, certain key staff members are provided with a laptop and mobile phone to respond to urgent e-mail in occasions.

Respondent E suggested that there must be ways to identify whether a member of staff is suffering from information overload or not. Then only can corrective measures can be taken. The current challenge is that most companies are not quite sure of whether there is information overload or not.

6.3.4.1 Summary of Objective 4

Guidelines proposed for good practice for managing information overload include prioritising information that should be dealt with first. It is also important to employ an experienced and well-resourced IT person/division/service. They should install software to filter, censor and prioritise e-mails and summarise or pre-process information. Training and support have also been identified by respondents as good practices to reduce information overload.

6.4 KEY FINDINGS OF THE QUALITATIVE STUDY

The interviewees indicated that they are aware of what information overload is. They defined it in terms of excessive and irrelevant information that is difficult to process and which leads to unfinished work and thus affects productivity. The business leaders are themselves affected by information overload. There was a strong majority who identified

the operations department to be most overloaded. They said that they do not believe that being overloaded with information is affected by demographic characteristics, but they do believe that middle management are the most overloaded as they have to process a lot of the information and consolidate it into reports for upper management.

More than 80% of the interviewees suggested that modern technology has worsened information overload. They believe that with modern technology it is quicker, easier and cheaper to generate, distribute and share information. Seventy five percent added that modern technology such as smart phones, tablets and laptops are cheap and easily available. These modern tools have made people reachable all the time. Some of the interviewees suggested that modern technology has also helped in reducing information overload. For instance, they mentioned that data are better formatted, easier to generate reports, have fewer human errors and that software can help in reducing information overload.

To manage information overload, some of the companies are using their IT departments and outsourced IT service providers to try to manage information overload. Some mentioned that they are using training to help with personal information management.

None of the companies had specific initiatives in place to help staff overloaded with information. The two reasons for this are that staff have not complained and there are no labour laws that need to be followed regarding information overload. Therefore, there are also no support programmes for rehabilitation of employees whose health has been affected by information overload. However, some of the existing HR support programmes such as office ergonomics practices, employee wellness programmes and training can indirectly help in cases where information overload is encountered.

A critical point is that throughout the interviews, none of the business leaders mentioned raising awareness of the subject to the employees.

6.5 SUMMARY OF CHAPTER SIX

This chapter presented the data obtained from the 12 interviews that were conducted with owners, managing directors and decision makers of the 12 shipping companies included in

this study. Themes were extracted from the interviews and the results were analysed and presented according to each of the objectives. Throughout the interviews, it became apparent that there are no policies in place regarding managing information overload. The interviews confirmed the literature review regarding the sources of information and causes of information overload. The interviews further identified some initiatives that can be put forward to help raise awareness of information overload and minimise and counteract it. As the research methodology encompassed a mixed methods approach, the following chapter links the literature review with the findings from the questionnaires and the interviews and presents the commonalities and differences disclosed by the findings.

CHAPTER SEVEN

TRIANGUALTION OF DATA

7.1 INTRODUCTION

Integrating of the quantitative and qualitative methods is an essential component of mixed methods research (Creswell *et al.*, 2016). The interpretation stage of this study involved comparing, contrasting, and synthesising the various study results and drawing integrated conclusions to the research question and sub-questions. This was achieved by an analysis and comparison of the findings from the questionnaires that were administered, the interviews with the respective decision makers and the literature review.

7.2 AWARENESS OF INFORMATION OVERLOAD

The findings from the quantitative and qualitative studies and prior literature regarding the awareness of information overload by both employees and decision makers are summarised in Table 7.1.

Table 7.1: Comparison of the findings on information overload

Finding	Quantitative	Qualitative	Literature
Information overload means receiving too much irrelevant information at work when there is not enough time to process all the available information	Yes	Yes	Yes
Employees are overloaded	Yes: 59%	Yes	Yes
Decision makers are overloaded	N/A	Yes: 92%	Yes
One gender is more overloaded than the other	Males:60% Females:57%	N/A	No
Certain race groups are more overloaded than others	Indians:61%	N/A	No literature
Relationship between gender, race and information overload	Black-Females:64%	N/A	No literature
Department most overloaded in participating companies	Operations	Operations	No literature
Responsibility for managing information overload	Individual	N/A	No Literature

According to Table 7.1, there is a common understanding among employees and decision makers regarding the definition of information overload in terms of quantity and quality of information and processing ability and its negative impact on employees. For example, respondent D stated that employees can only become overloaded with information if they cannot finish their work in the presence of excessive information – resulting in them getting stressed. Respondents of both the questionnaires and the interviews explained that information overload originates from e-mail. The respondents in the quantitative and qualitative studies thus confirmed what was contained in the literature.

The findings show that in 11 out of the 12 companies, employees are overloaded with information. According to the leader of company L, the staff are not overloaded, which contradicts results from the quantitative study which show that 56% of the employees are overloaded. Likewise, in Company F, the quantitative results indicate that the administration department has the highest number of overloaded employees. But according to the CIO of Company F, it is the operations department who are the most overloaded with information. The GM of Company K suggested the customer services department to be the most overloaded compared to operations as reported by the employees.

The quantitative results also indicate that among race groups, Indians are the most overloaded. And, Black females are the most overloaded. These two findings could not be verified with the interviews and there was no literature found to support the findings. It is evident that while the leadership claim to know what is happening in their companies, evidently, employees have a different opinion.

The analysis of the data shows that employees are overloaded with information. And, management are aware that employees are experiencing information overload.

7.3 EFFECTS OF INFORMATION OVERLOAD

One of the sub-questions was to study the effect of information overload on employees. The major findings from the questionnaires, interviews and literature are listed in Table 7.2.

Table 7.2: Comparisons of the findings on the effects of information overload

Effects of information overload	Quantitative	Qualitative	Literature
Decrease in work performance	Yes: 48%	Yes	Yes
Negative effect on relationship with family	Yes: 31%	Yes	Yes
Negative effect on relationship with colleagues	Yes: 27%	N/A	No literature
Adverse health effects	Yes: 38%	Yes	Yes
Wasting time to process information	Yes	Yes	Yes
Assist when making predictions in sales and marketing	N/A	Yes	No
One age group's work performance is more affected than the others	Yes: 60% 40-59 year	N/A	Yes 18-25 year

Information overload is mostly known for its negative effects, as has been reported by previous studies (Eppler & Mengis, 2004a; Zeldes, 2012). Both the quantitative and qualitative findings support the literature with regard to the effect of information overload. For example, one of the main effects of information overload in both the quantitative and qualitative findings is a decrease in work performance.

A small group of respondents found information overload to affect their work relationship. This could not be verified, as the effect of information overload on work relationships has not been reported in the literature.

There was positive feedback from the Director of Company B and CEO of Company J regarding information overload. CEO J suggested that information overload is good when making predictions about their business strategies. Director J reported that having more than enough information is good for sales and marketing.

The qualitative study shows that work performance is most affected in the age group 40-50 years. This diverts from the findings of the literature, where younger age groups were found to be the most affected.

The findings show that information overload has a negative consequence on organisations and employees. It has an adverse effect on employees' health, negatively affects family relationships, increases information-processing time and decreases work performance.

7.4 MANAGING INFORMATION OVERLOAD

With the rise of information overload in terms of causes and effects, questions of managing it has also arisen. The findings from the two data collection instruments of this study, in terms of managing information overload, have been categorised by managing responsibility and are presented in Table 7.3.

Table 7.3: Comparisons of the findings on managing information overload

Managing information overload	Responsibility	Quantitative	Qualitative	Literature
Develop policies	Management	Yes	Yes	Yes
Improve priority-setting practices	Individual	Yes	Yes	Yes
Improve information screening skills	Individual	Yes	Yes	Yes
Limit number of e-mail & social networking accounts	Individual & Management	Yes	N/A	Yes
Training	Management	Yes	Yes	Yes
Use of technology (software)	Management	Yes	Yes	Yes
Use IT services	Management	N/A	Yes	Yes
Limit electronic communication hours	Management	Yes	Yes	Yes
Have fewer meetings	Management	Yes	Yes	Yes
Assess communication culture	Management	Yes	Yes	Yes
Check level of information overload	Management	N/A	Yes	No literature
Good ergonomic practices	Individual & Management	Yes	Yes	No literature
Access control level to the Internet	Management	N/A	Yes	Yes
E-mail monitoring against employee productivity	Management	N/A	Yes	No literature

The exponential growth in the quantity of information and technology has also introduced several methods of reducing the problem of information overload. The responsibility of some of these remedies belong to both management and the individual.

Findings from the questionnaires and the interviews concurred that management should implement an information policy to reduce information overload. For example, some of the employees indicated that they want management to ensure that work information is dealt with or received during office hours only.

Both the respondents of the questionnaires and the interviewees strongly recognised that improving one's own priority-setting practices would help to alleviate information overload. What came out strongly in the questionnaires and interviews was training. Management and employees both recognised that training is crucial to help decrease information overload. Management added that using external services such as consultants, outsourced IT services and training companies would help to control the problem of information overload. Some companies are already using IT to manage information in their organisations, such as a group e-mail box and intranet.

The interviewees' responses indicated that improving the communication culture in the organisations can be beneficial. For example, the interviewees mentioned that there is too much reliance on electronic communication even in instances where face to face is the best alternative. Similarly, employees should be taught to recognise what information is important for the task at hand. Otherwise, irrelevant information gets circulated around the organisation.

Company L manages information overload by monitoring e-mail volumes against employee productivity. This is achieved by monitoring the volume of e-mail sent and received by each employee against their individual KPIs (key performance indicators).

These findings show that managing information overload is not only a management issue and that individuals can play an influential role in minimising it. For example, individuals can decrease information overload by improving their priority-setting practices. According to Hemp (2009), individuals should take control of their information problem by modifying their thinking and behaviour.

Management, on the other hand, should constantly monitor the level of information overload by individual employee, department and the company to access performance degradation in the organisation.

7.5 SUMMARY OF CHAPTER SEVEN

As the research methodology encompassed a mixed methods approach, this chapter presented the integration of the results from the literature review, quantitative analysis

and qualitative analysis. The integrated analysis has shown a convergence of the findings in terms of awareness, effects and management of information overload. An important conclusion that can be drawn from the integration is that a set of best practices to manage information overload is needed.

In the next chapter, conclusions are drawn, limitations are presented and suggestions are made for areas of future research.

CHAPTER EIGHT

CONCLUSIONS AND RECOMMENDATIONS

8.1 INTRODUCTION

During the literature review it was identified that very little is known about the extent to which information workers are experiencing information overload in South African shipping organisations. This gap in the literature was the basis of the aim of this study which was: to establish whether information overload exists in South African shipping companies and if it is being formally managed. To realise this aim, a literature survey was undertaken which served as the foundation upon which the empirical research was based.

This chapter presents a summary of the results and information gained from the study. It also provides a discussion of the implications, both conceptual and practical, for business leaders, specifically within the South African shipping industry.

8.2 KEY FINDINGS

The results of this study indicate that employees in the shipping industry understand the concept of information overload and believe that they are overloaded with information. They indicated that they believe it is better to manage information overload by adjusting their own information management practices. However, management can also help in the process by introducing policies and providing training on managing information overload.

- In general, there was a consensus among employees, managers and decision makers in terms of their understanding of the definition of information overload. They all defined the subject in terms of excessive quantity and inferior quality of information and limited processing ability and its undesirable effects on employees.

- There was also consensus that e-mail is the most used means of communication and the one technology that is causing the most overload.

- Information overload negatively affects organisations and employees. It decreases employees' work performance, negatively affects family relationships and harms their health. Organisations are affected as information overload delays decision

making and reduces employee productivity since more time is spent on filtering, categorising and processing information.

- Handling information overload is not merely a management issue as individuals can play an influential role in minimising it. For example, individuals can decrease information overload by improving their priority-setting practices.

- This study found that information overload is more prevalent among the smaller organisations. One reason may be that small organisations have fewer employees and that they perform multiple tasks across multiple departments.

- Currently, companies manage information overload via IT – internal departments or outsourced providers. Both employees and management suggest training on personal information management as a way to reduce information overload. Employees suggest that management should develop policies to control the problem.

- Companies do not have initiatives in place to help staff who are overloaded with information. They argued that no one had complained and since there are no labour laws defining or governing information overload, they could continue to overload their employees with information with no consequences.

Through the empirical and qualitative research, this study has shown that information overload is a problem faced by employees regardless of age, gender, education, or the size of the organisation. While there are solutions documented in the literature of how to manage information overload, not a single one individually will work for managing information in the shipping industry in South Africa. Furthermore, the findings from the qualitative results have identified new practices that are used to manage information overload.

Having identified how management and individuals in the shipping companies are managing information overload, the next section presents a set of recommendations for managing information overload.

8.3 RECOMMENDATIONS

It was specifically stated at the outset that this study endeavoured to investigate the effective management of information overload within shipping industries in South Africa. Based on the research findings some recommendations are proposed which are intended to contribute to creating a safer, healthier, more comfortable and more productive work environment where employees' knowledge and information processing capacity are managed and not crippled by information overload.

8.3.1 Best practices to manage information overload

As analysed and discussed, information overload does exist among shipping companies. From a theoretical perspective, the present study identified information overload as an individual, organisational and industry level problem. Adding to the researched area of the problem in the South African context, the results lead the proposal of a set of best practices to manage information overload (Table 8.1).

Table 8.1: Best practices for managing information overload

Managing information overload
Information management training
Encourage good office ergonomics practices
Introduce technology to control information flow and information quality
Use external service providers or information specialist to help in managing information flow
Use the right communication technologies for the task at hand
Constant monitoring of information against key performance indicators

These methods or technologies that have been found to be successful in reducing information overload in the South African shipping industry, and that can be used, or adapted for use, have been adopted as best practices to manage information overload (Table 8.1). The standards were chosen based on their relevance to the objectives of the study and their fit with the structure and philosophy of the organisation.

i. Information management training

Employees should be offered technology training, (i.e. search engines, spreadsheets, data storage and retrieval, e-mail management, etc.) to help them to better manage their information load.

ii. Encourage good office ergonomics practices

An ergonomically correct office work station will help employees avoid fatigue and discomfort. Work station ergonomics should include position of keyboard, mouse, monitor, phone, chair and desk and posture. Office workers should take regular breaks from their work and stretching exercises may reduce the risk of repetitive motion injuries. They should also take mini breaks to decrease the risk of musculoskeletal injuries when working with masses of information.

iii. Introduce technology to control information flow and information quality

Technology can help to decrease information overload. For example, computer software such as e-mail spam filtering technology to discard unsolicited incoming e-mail. Likewise, a decision support system (DSS) helps to reduce a large set of options to a manageable size. A DSS typically includes analytical and report-writing features, thus enabling users to translate raw data into a form useful for decision support.

iv. Use external service providers or information specialists to help in managing information flow

The standard operating procedures of the organisation should include using the services of an information specialist or an external service provider can help to cope with information overload. The specialist or service provider will have to organise and filter organisational information to manage unnecessary e-mails and create knowledge repositories of related information for easy access by the staff.

v. Use the right communication technologies for the task at hand

Employees must be taught how to choose the right communication tool for the job at hand. This requires considering the task at hand, the recipient, urgency of a message and how important it is to eliminate a possible misunderstanding. For example, a face-to-face conversation or a phone call might be a better communication tool compared to an e-mail for a specific task.

vi. Constant monitoring of information against key performance indicators

One way of measuring the level of information overload of the employee, is to monitor the amount of information processed (received and sent) by the employee against the specific KPI of the employee. The KPIs must be compared with historical data to serve as the basis for reporting and providing feedback on performance.

It is important for business leaders to realise that by recognising and understanding the organisational structures in which they work and the people with whom they work, they can better formulate effective policies and communication practices that fit their organisations. With no existence of a formal information management policy, organisations should adopt these best practices to deal with the situation.

8.3.2 Corporate governance

It is evident from this study that employees and management are experiencing information overload and they are also facing challenges managing the problem. It is recommended that policies need to be put in place, employees need to be trained, wellness surveys need to be conducted regularly, technology needs to be improved, help must be obtained from specialists, and employees need to be alert and take actions to reduce information overload.

8.3.2.1 Information management policy

The lack of policies regarding information overload needs to be urgently addressed by management. Among other points, these following five points must be included in an "Information Management Policy":

i. Silent times

Staff must not access work e-mails or the corporate intranet after work hours. Only staff who are on call should access work e-mail and the intranet after hours.

ii. E-mail etiquette

Staff must respect the privacy of fellow workers and as such should not be sending unsolicited mail to colleagues. Staff must "think" before clicking on the "reply all" or

"forward" button. They must only reply to the sender on a bulk e-mail or forward e-mails to recipients whose input of action is required.

iii. Web browsing

Private browsing during work hours needs to be banned in its entirety or specific times should be stipulated to prevent staff claiming to be overloaded with information which is not work related.

iv. Use of work electronic devices

Using the office technology to access private e-mail and social networks during work hours needs to be banned/blocked. The employer should reserve the right to interrupt or monitor staff usage of technology in the event that the staff member complains of being overloaded with information.

v. Complaints procedure

A clear complaints procedure needs to be documented outlining all the steps employees should follow in the event they feel overloaded with information. Similar to a grievance procedure, the information overload procedure must stipulate the manner in which the complaint must be lodged, to whom it must be lodged and the timeframe within which it must be lodged.

A policy merely regulates behaviour. However, technical solutions will help employees cope with the information tidal wave that hits them every day.

8.3.2.2 Technology

This study has showed that some software solutions are being used in the organisations to reduce information overload. Organisations should place an emphasis on technology as a tool and not the driver to reducing information overload. Management must make sure that employees are given the right tools so that they can improve their time and should consider the following:

i. Introduce specific software filters to reduce unwanted incoming messages

The software filter system needs to be installed on the company mail server for screening and turning away unwanted mails, while the desired e-mails pass through the system to

reach the recipients. Staff can also provide management with a list of e-mail addresses that must always be allowed and can also provide a list of e-mail addresses that must always be blocked. Presently, there are products that are capable of filtering out unsolicited messages and allowing wanted messages such as “Mimecast Targeted Threat Protection” and “Symantec Protection Suite Enterprise Edition”.

ii. Use of information management systems for supporting an easier prioritisation of information

Staff together with the help of managers must take time to prioritise their work and information according to the business needs. Improving information management practices must become a key focus for the organisations. An efficient information management system must be implemented to better understand how information is created, managed, used and stored. It must consider methods to reduce inefficiencies and prioritise usefulness of information. Depending on the business needs, information management systems, such as a decision support system or sometimes called collaboration tools might include technology solutions, such as content or document management systems, data warehousing, or workflow management applications. One of the products that is commonly used by organisations is “Microsoft SharePoint”.

iii. Use computer systems to assure that information is of high value, timely and delivered in the most convenient way and format

Organisations must invest in efficient computer software that integrates with the business and provides reliable, accurate and fast information. The computer system should make sure that duplicate captures are avoided. The computer system must generate high quality required reports that can be sent directly to upper management or head office without any additional users’ manipulation. Furthermore, when information is always available easily, staff are better informed and can make more accurate, faster decisions. Computer systems must also provide information to be used for tracking KPIs.

iv. Monitor the volume of e-mail sent and received by each employee against their individual KPI

Before implementing any KPI, organisations must ensure that employees understand their goal and the goal must be aligned with the business strategy. The number of e-mails

received and sent by each employee should be included in the KPI calculation of employees. The KPIs will inform organisations if employees are overload. Monitoring of these KPIs should be done at least once a month. The internal IT department or e-mail service provider should be able to provide management with e-mail statistics (receiving, sending and forwarding rates) per employee. The KPIs must be compared with historical data to help measure the employee's performance.

v. *Invest in larger computer screens with higher resolutions to encourage and aid employees to read from the screen instead of paper*

Organisations should invest in the larger displays which allow users to take advantage of being able to see more information at once and use fewer mouse clicks to scroll through large documents and lots of e-mails. Furthermore, encouraging employees to read from screen instead of paper makes economic or environmental sense – organisations will reduce paper, ink and toner costs.

The use of technology can help in managing information overload. However, for it to be effective, employees must have the skill to use the available technology to manage the load.

8.3.2.3 Coaching and training

Acknowledgement by management of a lack of practical skills in managing information is the first step for dealing with information overload. Training should help employees understand their information behaviour and handle information more effectively. Management must consider the following while crafting employees' coaching and training:

i. *Assess the best information environment for their organisations*

Managers must decide where training should take place; the work environment, the training room (if available), hired training room or the outsourced trainer offices. The learning environment must encourage employees to learn and apply their new skills once they return to work.

ii. *Assist managers and employees in selecting the best training and support programme for the organisation according to the behavioural information issues*

To best select the training programmes depending on the goals of the environment, management must consider the following:

- Establish the amount of required information
- Critically assess information and its sources
- Determine what information is required to effectively achieve employees' tasks
- The training must add to the employees' knowledge base.

Before deciding on the training programme, management must make sure that they understand why training is required and what will it solve.

iii. It is crucial that the training programmes are aligned with the information literacy of employees

Management must understand the level of information literacy of the employees and then select the appropriate training programme. An information literate employee must be able to:

- determine the needed information required to complete their work
- efficiently access and use information
- understand available information together with its sources
- prioritise, filter, manipulate and store information.

Management must recognise which skills employees are lacking and prepare training programmes according to the shortage. Employees who are able to collect, understand and critically analyse information are empowered to become more effective in the organisation.

iv. Training should include managing work-life balance with information management being a part of the support

Training on personal information management must also include work-life balance. A healthy work-life balance will help employees to feel more in control of their working life and will result in a less stressed workforce, lower absenteeism, increased productivity and

improvements in employee health and well-being. Moreover, healthy work-life balance initiatives must be part of the health programme in the workplace.

8.3.2.4 Wellness surveys

Organisations need to recognise that investing in the wellness of their employees will positively impact employees' health and well-being and create long-term value for the organisation. The definition of wellness in the organisation should encompass information management and information overload as physical health and psychological health are not the only determinants of wellness. A survey should evaluate organisational and employee wellness by gathering data from the following:

- Organisational wellness survey to reveal the extent to which opportunities exist in the workplace to pursue and maintain a healthy lifestyle
- Interviews with managers and employees to learn about the health effect of the problem of information overload in the organisation from multiple viewpoints.

Organisations must reward employees who voluntarily complete activities that include an assessment of their personal health and risk factors. These can range from filling out a questionnaire about family medical history, diet and fitness routine, to taking a biometric screening for measurement of physical characteristics such as height, weight, body mass index, blood pressure, blood cholesterol, blood glucose, and aerobic fitness tests that can be taken at the work site. These results must be used as part of a workplace health assessment to compare and evaluate changes in employee health status over time.

Interviews with managers and employees regarding the health impact of information overload should provide information on the level of stress, fatigue, physiological impact and specific problems the employees are experiencing.

The results of the survey and interviews must be compared to the occurrence of absenteeism, the number of human resource incidents and the number of sick leaves.

Organisations should not be reactive to the problem of health problems faced by employees, they should be proactive.

8.3.2.5 Information specialist

Since the organisations do not have any formal procedure in place to identify and counteract information overload, depending on financial measures, they should employ the services of an information specialist to organise and filter organisational information, to manage information flow and to make the information meaningful in their specific environment. The information specialist, whose expertise differs from that of other staff must be added to the existing workforce.

The information specialist will be responsible for compiling and organising information in order to make it easily accessible for those who are unable to keep up with the deluge of available information from the head office, ports, shippers, consignees, suppliers and ship crew members. In addition, the following can also be included in the duties of the information specialist:

- Aid users of information management systems
- Train users in the use of software applications
- Guide and assist with IT-related policies and procedures
- Implement and monitor security and management controls on organisations' computer systems and intranet
- Promote the use of emerging technologies, and ensure effective electronic connectivity with the ports and customs, such that EDI (electronic data interchange) messages are never reliable
- Create knowledge repositories to help staff find relevant information and reduce the time spent trying to find high-quality information.

The information specialist must work closely with management and employees on information issues that impact the business.

8.3.2.6 Information forums

Management must introduce an information forum for both management and employees to share information, solve problems, inspire ideas, and develop engagement among different departments. Staff can ask and get answers to questions, brainstorm, seek feedback, or get assistance with issues relating to information overload only. With a forum, managers or the information specialist can rapidly and efficiently determine where help and support are most needed.

This information forum must only deal with matters arising from problems with information overload. The information forum should meet a minimum of twice a month. They may meet more often, if required.

8.3.2.7 Employees' awareness and empowerment

None of the organisations made employees aware of the problem of information overload. Management must introduce an awareness campaign that explains in simple terminology what information overload is. The campaign material must provide guidelines for employees to self-diagnose that they are overloaded. The details for a helpline must be clearly highlighted.

8.3.3 Recommendation for the government

The information boom brought about by technology, especially the Internet, has placed a major burden on organisations to manage excessive information. This study has highlighted that information overload exists in shipping companies in Durban. The literature review has shown that information overload also exists in other industries. Therefore, it can be inferred that other organisations and industries could be experiencing similar challenges.

Government intervention may be required to re-examine the basic Conditions of Employment Act to protect employees from exploitation by employers to work after hours with no compensation in pay or time-off, simply because employees are connected 24/7. When employees are given electronic devices by their employers, there is an implicit expectation that the employee will be contactable at all times. However, there is no reciprocal expectation that the employee could ask for time off.

8.4 CONTRIBUTIONS OF THE STUDY

This study examined information overload in a natural setting and focusing specifically on information behaviour and interactions between employees, managers and decision makers. The study makes several contributions for organisations, government and researchers in the field of information management, especially information overload.

8.3.3 Contribution to the international community

It was found in the literature that among white collar workers, that information overload is a widespread and growing problem among professionals around the world, and affects productivity and employee morale. As this study addressed the problem within a South African context, the findings contribute to the international body of knowledge especially for the international shipping industry. South Africa, especially Durban, is the hub of shipping activity in Africa. This study will benefit other African and South African shipping companies to be proactive in managing information overload.

8.3.4 Academic contribution

The main purpose of social science research is to achieve academic impact by enhancing a discipline, and by having some positive impact on external audiences such as business, government, the media, and civil society. This study has provided the fundamental information, rationale and inspiration for contributing new visions and findings in the arena of information overload. The study has confirmed that substantial research in the field of information overload has been conducted and is accessible. However, there is little literature on the subject of information overload within the South African context. This study makes several contributions for both researchers and practitioners.

From a scholarly perspective, this study:

- contributes to the literature on human-information interaction by providing a context-rich, mixed methods study of the phenomenon of information overload of managers and employees in a South African shipping setting. Mixed methods were used in the past, however, this study focused in detail on the mixed method.

- makes an important contribution to the management information systems literature by providing insight into how information overload affects information processing and how this in turn is related to work performance.
- by analysing the personal information management practices of employees and managers, it proposes a set of best practices on how to manage information to improve operational practices.
- through qualitative research, established that there are no policies in place regarding managing information overload and identified what initiatives that can be implemented to help raise awareness of information overload in organisations.
- through quantitative research, showed that information overload has a negative impact on the interpersonal relationships as well as the health of employees in the Durban shipping industry. It has also highlighted that managers are not fully aware of the extent of information overload in their organisations, and they are not doing enough to manage the problem effectively.
- provides the basis for a new framework to measure the level of information overload in terms of KPIs. The number of electronic messages received and sent by an employee can be measured against the specific KPI of the employee.

Whilst the study has made a contribution to the existing literature, there is opportunity for new research as there are still a number of unanswered questions which will be discussed under section 8.6.

This study has practical implications as well. For the study recommendations to be successful:

- Management must introduce an information management policy to address information overload.
- By better understanding the causes of information overload and its effects on employees' performance and health, managers will be better able to design more effective countermeasures to reduce information overload.

- Business leaders must realise that the methods of processing electronic information is constantly changing in today's information fast-paced economy. If information processing is going to remain one of the primary tools needed for a business to be successful, then business leaders must be aware of the dangers of information overload and the tools available to manage it in order to maintain a healthy and productive organisation.

- Organisations should create knowledge repositories for sharing management information and best practices.

- Organisations should employ an information specialist to help in setting up formal procedures to identify and counteract information overload.

The recommendations and contributions presented so far show the complexity of the problem of information overload. Whilst the findings of the study could be applied in most instances, there were limitations which will be described next.

8.5 LIMITATIONS

Several concerns, including responses from a single location and industry, and generalisability due to the characteristics of the organisations in the study, are among the limitations of this research.

i. This study was conducted only in the city of Durban, South Africa, and not nationally. Whilst a local study identifies trends, a study at a national level is required to present a better understanding of the impact of information overload in South Africa. For example, Johannesburg, which is the economic hub of South Africa has been excluded from this study. The organisational culture in Johannesburg is different from Durban which could provide a different perspective from Durban.

ii. A shortage of information overload research on the shipping industry makes it difficult to conclude whether these results are typical to employees and managers in the shipping industry.

iii. Lastly, at the time of this study, no international literature regarding information overload in shipping industries in other countries was available. Thus, the findings could not be compared to shipping industries in other countries.

8.6 RECOMMENDATIONS FOR FUTURE STUDIES

Despite these limitations, this study can be seen as a step towards further multi-company research, which would potentially provide a strong foundation for the understanding of the causes and effects of information overload. The findings from this study have implications for the employees and managers in the shipping industry and should serve as a base for researchers to further explore the problem of information load. Additional research to replicate and extend the findings of this study are strongly indicated. The following research is recommended:

i. Calculating the cost of information overload

ii. The role of government in managing information overload

iii. The psycho-social impact of information overload on South African workers

iv. A longitudinal study on the effects of information overload on workers

v. A study on trade unions' perspective of information overload

vi. The long-term effects of information overload on individuals and organisations – could also be considered by future research.

8.7 CONCLUSION

The aim of this study was to establish whether management of shipping companies in Durban are aware of information overload and what they are doing to manage it in their organisations. This study has established that management know what information overload is and they are very aware of their own levels of overload. However, they are less aware and perhaps less sensitive to the overload being experienced by their employees. Some of the organisations have made attempts to manage information overload. However, management need to make employees aware of this new information age problem and

they have to develop support programmes to measure employee information overload at least twice a year. They also need to develop schemes to prevent employees from drowning in information or suffering from information burnout. This study has made a contribution to the literature in that it has highlighted that information overload exists in the one port of the South Africa shipping industry which is an indication that the whole industry could be affected. It has also highlighted that whilst research on information overload in South Africa is limited, other industries could be affected which necessitates a nationwide study that could have major implications for policy and labour legislation changes. The mixed method approach used for the study, whilst not a new approach, its application to this study has shown that management and employees have differing viewpoints on information overload. This study will help both parties to understand the problem better and to seek new and innovative solutions to jointly reduce information overload in organisations.

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APPENDIX A

LETTER TO GATEKEEPER

GRADUATE | SCHOOL OF | BUSINESS

UNIVERSITY OF KWAZULU-NATAL

The Managing Director
Company (Pty) Ltd
Dear Sir/Madam

9 October 2014

PERMISSION TO CONDUCT RESEARCH AT YOUR COMPANY

Mr Irshad Mungly is currently registered for a Doctorate in Business Administration. His study is based on the Management of Information Overload and seeks to answer the question "Are employees drowning in information due to the advances in information and communication technology?" Mr Mungly's study focuses on the maritime/shipping industry in Durban.

Your company has been selected as a potential participant in this study. On behalf of Mr Mungly I would like to seek permission for him to distribute his questionnaire electronically to your staff and to conduct face-to-face interviews with yourself, your Chief Information Officer or Information and Communications Director/Manager. The study will not in any way compromise the privacy of your staff or your company and will focus more on finding solutions for how businesses can help staff cope with the masses of information they are bombarded with rather than critiquing your current practices.

Should you consent to this study, I would be grateful if you could address a letter to the Registrar of the University of KwaZulu-Natal granting permission for the study to be conducted at your company. Furthermore, please include a statement whether you give permission for your company to be reported in all written documents and publications by name or whether you would prefer that it be reported anonymously.

Thanking you in anticipation

_____

Professor Anesh Maniraj Singh
Research Supervisor
Tel: 031-2607061
E-Mail: singham@ukzn.ac.za

APPENDIX B

QUESTIONNAIRE

UNIVERSITY OF KWAZULU-NATAL
GRADUATE SCHOOL OF BUSINESS
DBA Research Project
Researcher: Irshad Mungly (083 2894506)
Supervisor: Prof. Anesh Singh (031 2607061)
Research Office: Mariette Snyman (031 2608350)

Title of Survey:

The Effective Management of Information Overload within Shipping Companies in South Africa

Advances in technology has brought with it infinite new sources and new ways of exchanging information which includes voice and video phone calls, e-mail, social network sites, rich site summary (RSS), short message service (SMS) and instant messaging. Whilst information is readily available at one's fingertips, these modern sources of information and enhanced communication tools have resulted in information overload. The purpose of this survey is to solicit information from people in the shipping industries regarding information overload. This study is part fulfilment of the requirement for the DBA dissertation at the Graduate School of Business and Leadership at the University of KwaZulu-Natal.

The information and ratings you provide us will go a long way in helping us to compare the level of information overload amongst South African companies in the shipping industry and also to establish whether there is any formal method to manage information overload among these companies.

The questionnaire should only take 15-20 minutes to complete. If this questionnaire is to be useful, it is important that you answer each question frankly and honestly. There are no right or wrong answers to these questions. I am interested in what you think and feel about your present situation within your present organisation. If you wish to make a comment please add them in section "ADDITIONAL COMMENTS" at the end of this questionnaire. Make sure not to skip any questions.

If you have any questions or concerns that may be raised by participating in the study, please contact the Graduate School of Business and Leadership at the University of KwaZulu-Natal.

I hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

- ○ I accept

Thank you for participating!

INSTRUCTIONS: Please select by placing a check mark in the appropriate box.

1	**Age:**	○ 20 - 29 years ○ 30 - 39 years ○ 40 - 49 years ○ 50 – 59 ○ 60 years and over
2	**Gender:**	○ Male ○ Female
3	**Race:**	○ Black ○ Coloured ○ Indian ○ White
4	**Highest level of education:**	○ High School ○ Post Matric Diploma ○ University Degree ○ Post Graduate Diploma/Honours Degree ○ Master's Degree ○ PhD/Doctorate
5	**Your position in the organisation is:**	○ Non-Management ○ Supervisor ○ Junior Manager ○ Middle Manager ○ Senior Manager
6	**What division are you employed in?**	○ Accounting/Finance ○ Administration ○ Customer services ○ IT ○ Human resource management ○ Marketing ○ Operations ○ Production ○ Other, specify _____
7	**Total number of years of experience using computers and computer programs:**	○ Less than 1 year ○ Between 1 and 5 years ○ Between 6 and 10 years ○ Between 11 and 15 years ○ Over 15 years
8	**How would you rate your competence using computer technology?**	○ Novice user ○ Competent user ○ Proficient user ○ Expert user
9	**I believe that information overload is?**	○ Having too much information to make decisions

		○ Receiving too much information that is not relevant to do my work ○ When there is not enough time to process all the information that is available ○ Too much information for one person to absorb ○ Information is constantly changing such that I have to redo my tasks ○ The disorientation, frustration, or confusion resulting from too much information ○ My inability to process the volume of information to make decision
10	**Do you feel you are being overloaded with information?**	○ Yes -> Go to Q11 ○ No -> Go to Q16
11	**Since you answered "Yes" to question 10, how long have you been feeling overloaded with information?**	○ From the time I joined the organisation ○ Between 3 and 5 years since joining the company ○ From the time I got promoted to a senior position ○ Other, specify _____
12	**Since you answered "Yes" to question 10 rank the reasons why you feel overloaded with information where "1" causing the most overload and "6" cause the least.**	____ Too many electronic messages ____ Too many phone calls ____ Too many meetings ____ Too many reports to read and/or prepare ____ Too many office interruptions ____ Too much business-related news
13	**Has your level of information overload increased with modern technology?**	○ Yes -> Go to Q14 ○ No -> Go to Q15
14	**Since you answered "Yes" to question 13 rank the following electronic sources of information which has increased your work-related information where "1" increased it the most and "5" is increased it the least.**	____ Cell phones ____ E-mail ____ Teleconferencing (e.g. Skype) ____ Social Networks ____ Instant Messages
15	**How often do you experience information overload?**	○ Never ○ Very Rarely ○ Daily ○ Weekly ○ Monthly
16	**Do you prefer to receive:**	○ Electronic communication –> Go to Q17 ○ Written/Printed communication –> Go to Q18 ○ Verbal communication –> Go to Q19
17	**Why do you prefer electronic communication? -> Then Go to Q20**	○ It lets me combine numerous media (text, graphics, sound, video, …) into a single message ○ It lets me hold inexpensive video conferences from my desktop, laptop and smartphone ○ It lets me work on the same document together from colleagues from different locations

		○ Other, specify _____
18	**Why do prefer written/printed communication? -> Then Go to Q20**	○ It takes longer to read from a computer screen than from paper ○ It is easier to carry a piece of paper, a magazine, a book than a tablet or laptop ○ I can take as much time as you want to sculpture my response ○ Other, specify _____
19	**Why do prefer verbal communication? → Then Go to Q20**	○ Allows crucial information to be readily communicated ○ Feedback from verbal communication is most of the time immediate ○ Face-to-face communication is more effective for relationship building with managers and colleagues ○ Other, specify _____
20	**The type of electronic information I receive at work is hard to understand.**	○ Strongly Agree ○ Agree ○ Disagree ○ Strongly Disagree ○ N/A
21	**The quality of electronic information I receive at work is clear and concise for me to do my work.**	○ Strongly Agree ○ Agree ○ Disagree ○ Strongly Disagree ○ N/A
22	**The quality of electronic information I receive at work is not relevant for me to do my work.**	○ Strongly Agree ○ Agree ○ Disagree ○ Strongly Disagree ○ N/A
23	**The electronic information I require to do my work is not available timely enough**	○ Strongly Agree ○ Agree ○ Disagree ○ Strongly Disagree ○ N/A
24	**I feel that the type of information I received at work has a negative impact on my job performance**	○ Strongly Agree ○ Agree ○ Disagree ○ Strongly Disagree ○ N/A
25	**When I need to find a document in my possession,**	○ I usually know exactly where to find it ○ I usually have trouble finding it ○ I can find it more readily if it's in electronic form (on my computer or online) ○ I can find it more readily if it's on paper

26	**Rank how you spend your time managing information where "1" is the most time and "5" is the least time spent.**	____ Deciding how to handle incoming messages and communications ____ Gathering information from sources other than the Internet ____ Retrieving information already in my possession ____ Preparing and assembling information for the use of others ____ Communicating information to others
27	**The excessive amount of electronic information I receive at work negatively affects my work performance.**	○ Strongly Agree ○ Agree ○ Disagree ○ Strongly Disagree ○ N/A
28	**The excessive amount of electronic information I receive at work negatively affects my relationships with colleagues.**	○ Strongly Agree ○ Agree ○ Disagree ○ Strongly Disagree ○ N/A
29	**The excessive amount of electronic information I receive at work negatively affects my relationship with my family.**	○ Strongly Agree ○ Agree ○ Disagree ○ Strongly Disagree ○ N/A
30	**The excessive amount of electronic information I receive at work negatively affects my relationship with my friends.**	○ Strongly Agree ○ Agree ○ Disagree ○ Strongly Disagree ○ N/A
31	**The excessive amount of electronic information I receive at work negatively affects my physical well-being**	○ Strongly Agree -> Go to Q32 ○ Agree -> Go to Q32 ○ Disagree -> Go to Q33 ○ Strongly Disagree -> Go to Q33 ○ N/A -> Go to Q33
32	**Since you answered, "Strongly Agree or Agree" to question 31, what health effects had information overload had on your well-being? Select the top three**	○ Eye Strain (Irritation/itching, redness, blurring, ...) ○ Head ache ○ Mental fatigue ○ Musculoskeletal Pain (stiffness in neck/shoulder/back/hand) ○ Increase in the level of stress ○ Anxiety and self-doubt (leading to wrong decisions and flawed conclusions) ○ Analysis paralysis (getting lost in thought due to excess options)
33	**I believe that my information overload can be best minimised by:**	○ Management interaction -> Go to Q34 ○ Adjusting my own practices -> Go to Q35

34	**Since you answered, "Management interaction" in question 33, what can management do to assist you?**	○ Develop policies to minimise information overload ○ Provide training to cope with information overload ○ Introduce technology to minimise information overload ○ Limit electronic communication to work hours only ○ Have fewer meetings ○ Other, specify _____
35	**Since you answered, "Adjusting my own practices" in question 33, what would you do to manage your information overload?**	○ Improve my information screening skills ○ Improve my priority-setting practices ○ Limit my number of e-mail and social networking accounts ○ Turn off instant message notifications ○ Work from home ○ Other, specify_____
36	**Do you have any further comments regarding information overload in your company?**	○ Yes -> Go to Q37 ○ No -> Go to End of Questionnaire

37 Your additional comments regarding information overload.

Your comments and suggestions

END OF THE QUESTIONNAIRE

Thank you for taking the time to complete the questionnaire.

APPENDIX C

INTERVIEW GUIDE

1. What are the sources of information in your company?
2. Do you know what information overload is? Explain
3. Are you overloaded with information? Explain
4. Who do you believe is most overloaded with information (age, gender, department, seniority, …)
5. Are your staff overloaded with information? Explain
6. What role is modern technology playing in information overload of staff, yourself and the company?
7. What are the consequences of having too much information?
8. What is your company doing to manage information overload?
9. Does your company have any initiatives in place to help staffs who are overloaded with information?
10. Do you have any support programmes to rehabilitate staff whose health has been affected by information overload?
11. What would you consider as good practice to manage information overload?
12. Do you have anything more you would like to add on this subject?

APPENDIX D

TURNITIN REPORT

Turnitin Originality Report
Jun 28 Resubmit by Irshad Mungly
From Thesis submission for turnitin report (Doctoral 2017)

- Processed on 19-Jul-2017 8:32 PM CAT
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APPENDIX E

EDITING CERTIFICATE

TO WHOM IT MAY CONCERN

Language editing

I, Jeanne Enslin, acknowledge that I did the language editing of **Irshad Mungly's** dissertation submitted in partial fulfilment of the requirements for the degree Doctor of Business Administration at the University of KwaZulu-Natal.

As agreed with the Irshad, I did not do formatting and I did not check or work on the List of references or do cross-referencing as he was satisfied that he had done that correctly.

The title of the dissertation is:

THE EFFECTIVE MANAGEMENT OF INFORMATION OVERLOAD WITHIN SHIPPING COMPANIES IN SOUTH AFRICA

If any significant text changes are made to the electronic document that I sent to Irshad Mungly on 23 June 2017, I cannot be held responsible for any errors that are made. Alternatively, the document needs to be returned to me to check the language of the changes.

Detailed feedback about the work done has been provided to Irshad. The quality of the final document, in terms of language, remains the student's responsibility.

[redacted]

Jeanne Enslin
Language editor

082-6961224.

J H Enslin BA (US); STD (US); Hons Translation Studies (Cum laude) (UNISA)

APPENDIX F

ETHICAL CLEARANCE

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

04 September 2015

Mr Mohamud Irshad Mungly (931320493)
Graduate School of Business & Leadership
Westville Campus

Dear Mr Mungly,

Protocol reference number: HSS/0734/015D
Project title: The effective management of information overload within shipping companies in South Africa

Approval Notification – Amendment Application

This letter serves to notify you that your application and request for an amendment received on 15 August 2015 has now been approved as follows:

- Change in Research Instrument (Questionnaire)

Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form; Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

Best wishes for the successful completion of your research protocol.

You[redacted]

.....

Prof[redacted]niversity Dean of Research)
On behalf of Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Professor Anesh Singh
Cc Academic Leader Research: Dr Muhammad Hoque
Cc School Administrator: Ms Zarina Bullyraj

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
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Website: www.ukzn.ac.za