FRAMEWORK FOR DYNAMIC RISK MANAGEMENT IN RESPONSIVE ORGANISATIONS

By

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Dedication

*To my loving and supportive husband Lubabalo and my daughters Likho and Lamani.
Without your support, understanding, patience and motivation throughout this journey I
would never have achieved this. God bless you. I love you*

*To my grandfather Nkosibomvu as you rest in peace this is dedicated to you. You inspired me
from the grave; as a little child I promised I would do this in remembrance of the man you
were. I vowed to honour the name DIDI and through God's grace I have achieved this.*

Thank You

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I would like to thank my husband, Lubabalo (Boisii) for the love and support that he has given me. I feel very blessed and loved by God that He has given me the gift that is YOU.

To my daughters Likho and Lamani who are my life. I live to inspire you so that you can be proud of me both as a mother and as a woman.

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Lastly to Him through whom all things are possible goes the greatest thanks for His unending mercy and grace. It was not through my own power, wisdom, endurance and tenacity that I achieved this, but through the divine influence which accompanied me.

Abstract

In a fast-moving business environment open to global competition and with the proliferation of new technology, risk management is fundamental to doing business, especially considering the dynamic nature of the environment in which organisations now exist. Organisations are subject to constant change and therefore require the capabilities to quickly and successfully respond to aggressive competitors and navigate volatile markets. Risk management as a tool that supports organisations in their decision making is fundamental to the delivery of value-adding products, solutions and services through effective identification, assessment, monitoring and reporting of risks that may affect an organisation's ability to meet both their strategic and business objectives.

The challenge faced by the risk management function operating in a dynamic and rapidly changing organisational environment is the capability to continuously innovate, evolve and transform its risk management processes to meet the needs of the organisation. Strong dynamic capabilities such as sensing, seizing, manage and transform are therefore required to foster agility and resilience within the risk management practices, supported by a foundation of risk management principles that promote business facilitation. In today's dynamic organisational environment, to prevent or reduce the likelihood of undesirable events from occurring or to decrease the severity of the consequences should an event occur, a dynamic risk management framework and principles should ideally be established. A dynamic risk management framework and principles enables an organisation to continuously sense and respond to risks (opportunity and threats), continuously transforming the risk management function to meet the dynamic risk management nature of the organisation.

In this research a dynamic risk management framework has been developed considering the agility attributes *(responsiveness, speed, potential and flexibility)* as well as the dynamic capabilities *(sense, seize, manage and transform)*. Dynamic risk management principles *(integrate, internal and external context, business facilitation and inclusive)* as the foundation of the framework have been defined; having a fundamental impact on the establishment of a dynamic risk management framework and processes within an organisation. The dynamic risk management framework developed enables an organisation to map the risk management processes *(identify, assess, evaluate, monitor and report)* to the organisation's dynamic capabilities and agility attributes that may assist in conducting dynamic risk management.

The framework also assists in identifying characteristics of dynamic capabilities and factors influencing agility in the risk management process applied. Lastly, the dynamic risk management framework can be used to assess organisation's maturity in conducting dynamic risk management and understand the organisation's risk identification and mitigation capabilities by considering both dynamic capabilities and agility attributes.

Framework for dynamic risk management in responsive organisations

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PART 1: Introduction and Background

Chapter 1: Introduction

1.1. Introduction

Globalization and technology advancements have disrupted the organisational landscape influencing how people live, think and interact. In a time of extraordinary economy and market disturbances as well as changing market conditions, organisations are faced with the challenge of being competitive and having to meet customer requirements (Sarah, Gale, Bakker, & Steinberg, 2012). Organisational flexibility is defined in terms of an organisation's response to change, as well as the ability to sense environmental change and respond readily (Overby, Bharadwaj, & Sambamurthy, 2006). Therefore, organisations are increasingly required to be fast moving, rapidly creating new products through the use of different exponential, agile and lean technologies and methods (Burba, 2015); possessing the capabilities to respond to aggressive competitors, quickly navigate volatile markets and successfully penetrate various markets (Burba, 2015). In order to create such an adaptable and flexible organisation, organisations are required to review their management processes, organisational roles and responsibilities, supporting technologies as well as decision making processes; as this is a matter of necessity if organisations want to survive in a changing world (Coulson-Thomas, 1990).

Organisational environments change and because of the uncertainty of the environment in which they operate, these changes may have an impact on the organisation's decision making processes (Knight, 2012). The reliance on risk management practices to aid in this decision making process is therefore vital (Blanco, Hinrichs, & Robert, 2014) , taking into account the effect of uncertainty on achieving the organisation's objectives (ISO, 2009).

1.2. Background

Risk management forms part of an organisation's decision making processes (ISO, 2009); contributing to an organisation experiencing exceptional growth. Risk management is defined in ISO 31000 (2009) as the identification, assessment, and prioritization of risks executed by

applying a logical, systematic and methodical approach of risk assessment. Risk management as a decision making tool should be aligned to the organisation with specific focus on the organisation's processes, so as to assist in the active and effective management of risk across the business (ISO, 2009).

The ability of an organisation to be responsive to changing conditions requires that it addresses uncertainty which may be generated through innovative initiatives and market change (Teece, Peteraf, & Leih, 2016). With the emergence of dynamic, rapidly growing and responsive organisations such as exponential organisations (ExO), virtual organisations (VO) and agile organisations, the challenge now faced by the risk management function is the question of linearity, where risk management processes are planned methodically and systematically applied. Agility within organisations is not easily attained due to organisation-wide functions and processes still functioning and operating in a linear manner (Holbeche, 2018; Mabey, C., Salaman, G., Storey, 2001). Current risk management practices are not sufficient as they cater for linear, segmented and hierarchical organisational structures. Traditionally risk management has always followed a more linear approach to the identification, assessing, managing and monitoring of risks (IEEE, 2001), providing drawn-out projections of emerging risks and tracking currents risks within the control environment of a stretched period of time.

The Committee of Sponsoring Organisations of the Treadway Commission (COSO) and the ISO31000 are well known risk frameworks that have been developed for the management of risks. COSO was updated in 2017 to the Enterprise Risk Management - Integrated Framework - COSO. The changes are said to address the need for organisations to improve their approach to managing risk so as to meet the demands of an evolving business environment. With the adoption of COSO, organisations are said to be able to understand how risk may impact the outcome of the business strategy and objectives.

ISO31000 is currently best practice for risk management frameworks, incorporates best practice from COSO (Fraser & Simkins, 2010) and provides a generic guideline for risk management, without the intention of imposing uniformity of risk management practices. ISO 31000 includes a detailed list of the suggested principles for risk management and has an open system model to fit multiple needs and context. Therefore ISO 31000 can be used as a reference when developing a dynamic risk management framework. Both COSO and ISO update discuss the important influences that culture and biases carry in decision making and

risk management practices, but no guideline is given on how organisations operating in dynamic and changing environments can implement risk management.

(Walczak & Kuchta, 2013) say that adequate risk management capabilities are needed when operating in an environment of uncertainty and risk management is the product of both agility and capability. From the way in which organisations are run, it can be perceived that risk today is easier than ever to manage because of the ability to transfer or contract risk away through risk-sharing arrangements, yet organisational agility needs to be part of the risk management systems and structures so that risk management procedures and protocols can be introduced to help manage the unknown.

Nyfjord & Kajko-Mattsson (2008) attempts to solve the problem by suggesting the integration of the risk management processes with the agile development processes. The integrated model developed provides a useful reference model, making risk management explicit on an organisational-wide level. The model does not however provide guidance on how risk management was conducted, and it was in conflict with several agile principles thus compromising agility. The integration model provided for how to conduct integration of risk management and agile process without providing the guidelines on how to actually conduct risk management in an agile environment. Therefore, in this research a dynamic risk management framework is developed and applied with the foundation of dynamic risk management principles so as to identify the elements that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment

1.3. Problem Statement and Purpose of Study

Responsive organisations such as exponential organisations (ExO), virtual organisations (VO) and agile organisations are designed, structured and operate differently from traditional organisations. Dynamic, exponential and disruptive thinking have been introduced in these organisational environments with the goal of delivering exponential growth. Unfortunately, much of this thinking has been introduced in linear organisational environments where organisational functions such as risk management still operate (Ismail, Malone, & van Geest, 2014).

Dynamic capabilities as defined by Teece (2007) include sensing, seizing, and the management of threats and transformation, and are much needed capabilities to meet the risk management demand of organisations existing in dynamic environments (Nair, Rustambekov, Mcshane, & Fainshmidt, 2013);

- Sensing (and shaping) opportunities and threats is to identify and shape opportunities, by organisations constantly scanning, searching and exploring across technologies and markets.

- Seizing opportunities is when a new technological or market opportunity is sensed, it is exploited through new products, processes or services; and

- Managing threats and reconfiguration, which is key to sustaining profitable growth and the ability to recombine and to reconfigure assets and organisational structures as the enterprise grows and as markets and technologies change.

How an organisation is structured and operates informs the organisation's risk management practices hence in order to perform effective risk management, constant alignment should exist between the organisation and risk function. Organisations with a highly developed culture of agility are able to quickly respond to market conditions, be it threats or opportunities; hence the importance of culture when referring to agility as this may impact on the ways of work within an organisation (Burba, 2015). Furthermore, adequate risk management capabilities are needed when operating in an environment of uncertainty (Walczak et al., 2013) as risk management is the product of both agility and capability. The following observations have been highlighted regarding risk management in both traditional and dynamic environments:

- In a conventional sense, the current systematic and linear risk management approach applied (Nyfjord & Kajko-Mattsson, 2007b) is in line with the organisational structure of the traditional organisation which is linear in nature (Mabey, Salaman & Storey, 2001)

- The ecosystem of responsive organisations is that of being dynamic, responsive, fast-moving and non-linear (Boehm & Turner 2003a), hence risk management in a dynamic, rapidly growing and responsive organisation must be differently defined and executed;

- Risk management in responsive organisations can be difficult and ineffective therefore the alignment of an organisation's risk management programme with the

organisation is key as risk management and will yield a competitive advantage (Wang, Barney, & Reuer, 2003);

- Responsive organisations need to ensure that their risk management practice has well defined sensing capabilities that will allow the organisation to identify, analyse and measure risks as well as identify emerging opportunities (Nair et al., 2013). This will allow an organisation to respond to the dynamic environment surrounding it (Nair et al., 2013);

- Dynamic risk management as a consideration for organisations that have emerged or transcended to becoming more responsive to the market and economy, possessing risk expertise that constitute dynamic capabilities critical for organisations operating in turbulent environments (Helfat, Finkelstein, & Mitchell, 2007); and

- The integrated model by Nyfjord & Kajko-Mattsson (2008) can be regarded as useful for anybody interested in comparing an organisation's risk management practise. However, without providing guidelines on how to actually conduct agile risk management, its utility was considered limited. As a result it was suggested that the integrated model should be extended with guidelines on how to conduct agile risk management.

In the light of the above, a dynamic risk management framework and principles should be developed to guide responsive organisations towards implementing essential components for managing risk, as well as integrating risk management programmes within organisations that may have dynamic capabilities (Helfat & Winter, 2011). The purpose of this study is to develop a framework with the elements that will guide an organisation to apply more dynamic risk management principles in a dynamic environment.

1.4. Research Objectives

In order for organisations to respond to change, they need to have the ability to make changes whenever challenges emerge (Ganguly, Nilchiani, & Farr, 2009). Organisational functions such as risk management therefore need to acknowledge that following a systematic, methodical and linear risk approach in a dynamic environment, may not enable organisations to effectively use risk management in their decision making processes (Burba, 2015). The practicality of agility within risk management has to be considered from a guidance and

implementation perspective therefore this research aims to develop a dynamic risk management framework that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment, guiding organisations that are traditional, virtual, exponential as well as agile.

The dynamic capabilities framework (DCF) is used as a guiding theory that may assist in the development of a dynamic risk management framework and principles(Nair et al., 2013). (Teece et al. 2016), states that organisations with superior dynamic capabilities are more knowledgeable and aware of when to sacrifice efficiency for agility and because of that are able to obtain more favourable agility/efficiency trade-offs. The same thinking can be applied within risk management function in terms of how risk management is conducted. Identifying the dynamic capabilities to conduct effective risk management makes the risk fraternity more aware of when to sacrifice agility (speed of response or risk velocity) and / or resiliency (resource appropriately deployed) (Davis & Lukomnik, 2010) through the use of a dynamic risk management framework.

1.5. Research Question

Based on the research objectives this research aims to develop a dynamic risk management framework that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment.

The main question (MQ) to be answered in this research is:

MQ: What are the elements of a framework that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment?

The following sub-research questions (SQ) will assist to answer the main research:

- **SQ1** - What constitutes a traditional risk management framework?
- **SQ2** - What are the guiding principles that organisations use in risk decisions?
- **SQ3** - What constitutes risk management in dynamic environments?

The design and implementation of dynamic risk management frameworks will need to consider the complexity of the environment in which an organisation operates, providing guidelines on implementation that are essential for a dynamic environment.

1.6. Research Strategy

This research is designed in order to address the research questions presented.

Main Research Question:

What are the elements of a framework that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment?

The philosophy chosen for this research is that of interpretivism as this will allow the research to look at how the research participants view dynamic risk management (Bahari, 2010). Having adopted an interpretivist view, a survey as research strategy was chosen due to the fact that it allows for large amounts of data to be collected from organisations over a short period of time. In addition to that a survey can be used in various ways such as questionnaires and interviews. In this research study the research participants will provide a view of how they perceive their risk management function (individually) through their own work experience in the organisational structure (traditional, agile, virtual, exponential and digital) in which they work. Then an understanding of existing risk management frameworks, process and principles will be gained through the meaning and values assigned to it of the research participants; taking into account the different perspectives of professionals in different organizational structure. A rich understanding of dynamic risk management would be obtained by looking at how the risk management function and risk practitioners engage organisations that operate within a dynamic environment.

The purpose of this study is to develop a dynamic risk management framework and principles that will identify the elements that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment. An overview of the thesis is presented in (figure 1-1) consists of five phases, namely the literature review, design and development, proof of concept, integration and contribution. The detailed research design and methodology is further discussed in chapter 3.
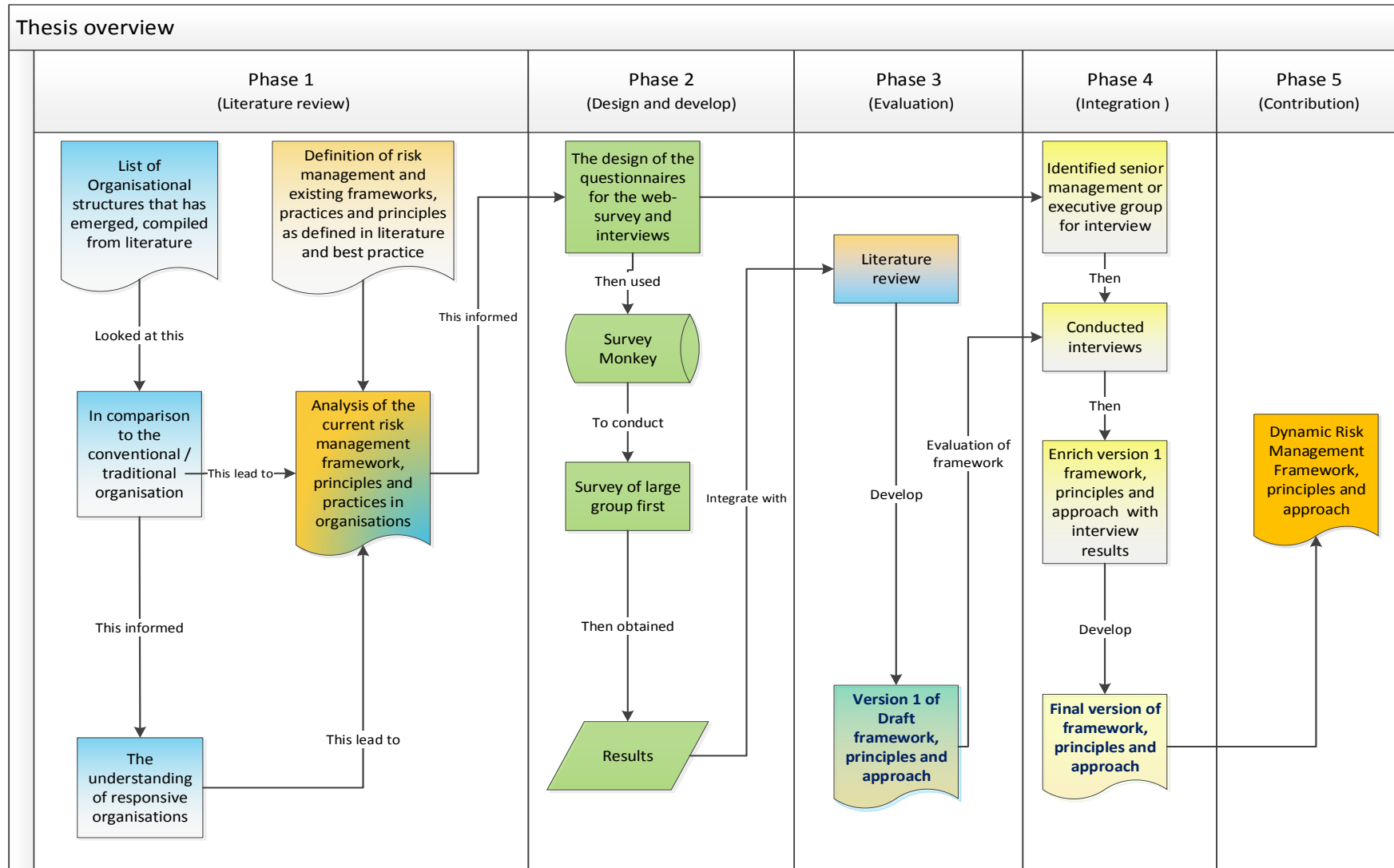
Figure 1-1: Overview of thesis

As depicted in figure 1-1 the research consists of five phases.

- Phase 1 - Literature review. This phase entailed the review of existing literature on organisations such as agile, virtual, exponential and conventional. It looks at the organisation and its way of working and also considers the risk management in the context of these organisations.

- Phase 2 - Design and develop. During this phase research questionnaires for both the online questionnaire and semi-structured interviews were developed. These were based on the literature review that had been done in phase 1 of the study. For the online questionnaire the questionnaires were uploaded on a data collection tool and the survey was sent out to the identified population.

- Phase 3 - Evaluation. During this phase results collected during phase 2 (design and develop) of the study was evaluated together with the information gathered from the literature review phase (phase 1) to produce the initial (version 1) dynamic risk management framework and principles.

- Phase 4 - Integration. In this phase the version 1 framework developed in phase 3 was evaluated with selected research participants of executive and senior management. This was done by conducting semi-structured interviews as well as presenting the framework for input.

- Phase 5 - Contribution. The input gathered during the semi-structured interviews of the integration phase as well as the interview results were used during this phase as input for the final version of the dynamic risk management framework and principles.

The design phases, particularly phase 2 and phase 4, were done with a population from responsive organisations, including agile, digital, virtual, exponential and traditional organisations.

1.7. Outline of the Study

The study consists of five parts with seven chapters and two appendices as shown in figure 1-2.

Figure 1-2: Research Outline

Part 1 provides an introduction to the study. It includes the introduction and background to the study, the problem statement and purpose of the study while the research objective and research questions are stated. The first chapter introduces the study and gives a view of the research design applied in the study as well as the rationale and contribution of the study.

Part 2 is the literature review and research approach two of the study and is made up of two chapters namely chapter 2 and 3. Chapter 2 is the literature review focused on understanding existing risk management practices and frameworks, traditional organisational structures and agile, virtual and exponential organisations structures. In addition to that chapter 2 looks at the dynamic capabilities approach in the context of organisational agility and more specifically the risk management function's ability to continuously evolve and transform. In chapter 3 the research philosophy, approach and strategy is discussed as well as the research design and methodology applied within the study.

Part 3 consists of two chapters namely data analysis and integration of findings. Chapter 4 data analysis includes the analysis of data and reporting of the summary of findings. Chapter 5 contains the integration of findings and the presentation of the initial dynamic risk management framework and principles.

Part 4 consists of chapter 6 which describes the evaluation and contribution. In this chapter the initial framework and principles are evaluated and includes the interview results used to enrich the initial dynamic risk management framework and principles.

Part 5 consists of chapter 7 and chapter 8. Chapter 7 discusses the research contribution of the study from a theoretical and practical perspective and chapter 8 provides the conclusion of the study.

Part 6: For the entire study there are two appendices namely:
- Appendix A containing the online questionnaires, and
- Appendix B consisting of the Dynamic Capabilities Framework.

PART 2: Literature Review and Research Approach

Chapter 2: Literature Review

2.1. Introduction

The purpose of this chapter is to provide an introduction to the main concepts relevant to this research by gaining an understanding of what literature exists or says regarding *responsive organisational structures*, *risk management* and the *dynamic capabilities approach* so as to answer the main research question.

Main Research Question:

What are the elements of a *framework* that will guide a *responsive organisation* to apply more *dynamic risk management principles* in a dynamic environment?

Figure 2-1 presents the outline of chapter 2, consisting of six sections. Section 2.2 looks at risk management principles, framework, processes and risk culture. Section 2.3 looks at organisational structures those being conventional / traditional organisations and their risk management practices, agile organisations (AO) starting off by looking at agility in the domain of software development and continues to expand on agile values and principles aligned to risk management, virtual organisations (VO) studying how they are structured and work then ends with virtual organisations in the context of risk management, then exponential organisation (ExO) are unpacked looking at exponential versus linear in the context of risk management. To conclude this section a summary of the organisational structures is presented. Section 2.4 introduces the concept of organisational agility and looks at the dynamic capabilities framework and what is meant by responsive organisations. Section 2.5 presents the challenges of risk management considering responsive organisations. Section 2.6 provides a conclusion to the chapter.

Part 2: Literature review and Research Approach

Chapter 2 Outline: Literature Review

Section 2.1. Introduction

Section 2.2. Risk Managment	→	Section 2.2.1: Risk Management Framework
	→	Section 2.2.2: Risk Management Principles
	→	Section 2.2.3 : Risk Management Process
		Section 2.2.4 : Risk Culture

Section 2.3. OrganisationAl Structures	→	Section 2.3.1.: Conventional / Traditional Organisations
	→	Section 2.3.2.: Agile Organisations
	→	Section 2.3.3. Virtual Organisations
	→	Section 2.3.4. Exponential Organisations
	→	Section 2.3.5. Organisational Structure Summary

Section 2.4. Organisational Agility	→	Section 2.4.1. The concept of agility
	→	Section 2.4.2. Dynamic capabilities and agility
	→	Section 2.4.3. Responsive organisations – Organisational agility and dynamic capability

Section 2.5. Challenges of risk management considering responsive organisations	→	Section 2.5.1: Risk Assessment
	→	Section 2.5.2: Risk Culture
	→	Section 2.5.3 : Dynamic capabilities in risk management
	→	Section 2.5.4 : Gap in current research

Section 2.6. Conclusion

Figure 2-1: Overview of chapter 2

2.2. Risk Management

Risk management has become an increasingly important business driver of strategic decisions (ISO, 2009). Stakeholders both external and internal to the organisation have become much more concerned about risk (Nair et al., 2013) understanding that adequate risk management capabilities are needed when operating in an environment of uncertainty (Walczak & Kuchta, 2013)

Organisations of all forms, types and sizes face a range of risks that can affect the achievement of the organisation's objectives. These organisational objectives can relate to a range of organisational activities, such as strategic initiatives, operations and processes; reflected in terms of strategic, operational, financial and reputational outcomes and impacts. All activities within an organisation involve risk management, so risk management aids in decision making by taking into account uncertainties that may impact on or stop the business from reaching or achieving its objectives by assessing the need for a specific action (ISO, 2009). An enterprise- wide approach to risk management is therefore implemented, enabling an organisation to consider the potential impact of all types of risks on all processes, activities, stakeholders, products and services. The global financial crisis in 2008 demonstrated the importance of adequate risk management (Nair et al., 2013). Since that time, new risk management standards have been published, including the international standard, ISO 31000 'Risk Management – Principles and Guidelines' (2009). This guide draws together these developments to provide a structured approach to implementing Enterprise Risk Management (ERM) with intended benefits of risk management for all types of organisations. Before an organisation engages in *selecting the most effective strategy or decision* an organisation needs to understand the risks being taken when seeking to achieve these objectives: assessing the organisations exposure, risk profile, financial position and acceptable risk and reward trade-off. For the ERM to be effective, it must be directly connected to company strategy and *designed to recognize events that could have impact on company performance* as defined by its strategic objectives. An ERM program is designed to *provide assurance* that a company achieves its strategic objectives so strategy and risk management should be aligned (Sara Soltanizadeh, Abdul Rasid, Mottaghi Golshan, & Wan Ismail, 2016). A successful enterprise risk management (ERM) initiative can affect the likelihood and consequences of risks materializing, as well as deliver benefits related to better *informed strategic decisions, successful delivery of change and increased operational*

efficiency. Other benefits include: *reduced cost* of capital, more accurate financial reporting, *competitive advantage, improved perception of the organisation and better marketplace* presence and enhance informed decision making ability (Soltanizadeh et al., 2016)

2.2.1. Risk Management Frameworks

2.2.1.1. Committee of Sponsoring Organisations of the Treadway Commission (COSO) Enterprise Risk Management Framework

The Committee of Sponsoring Organisations of the Treadway Commission (COSO) published an Enterprise Risk Management (ERM) standard in 2004 (Moody, 2011). The COSO ERM cube is familiar to risk management practitioners and it provides a framework for undertaking ERM. It has gained considerable influence because it is linked to the Sarbanes-Oxley requirements for companies listed in the United States (Moody, 2011).

In 2017 an update to the Enterprise Risk Management - Integrated Framework - COSO was released. These changes address the need for organisations to improve their approach to managing risk so as to meet the demands of an evolving business environment and it highlights the importance of considering risk in both the strategy-setting process and in driving performance, depicted in figure 2-2.

Figure 2-2: COSO Enterprise Risk Management Framework – 2017

The framework is a set of principles organised into five interrelated components these being:

1. *Governance and Culture.* Governance sets the organisation's tone, reinforcing the importance of, and establishing oversight responsibilities for, enterprise risk management. Culture pertains to ethical values, desired behaviours, and understanding of risk in the entity.
2. *Strategy and Objective-Setting*. Enterprise risk management, strategy, and objective setting work together in the strategic planning process. A risk appetite is established and aligned with strategy; business objectives put strategy into practice while serving as a basis for identifying, assessing, and responding to risk.

3. *Performance.* Risks that may impact the achievement of strategy and business objectives need to be identified and assessed. Risks are prioritized by severity in the context of risk appetite. The organisation then selects risk responses and takes a portfolio view of the amount of risk it has assumed. The results of this process are reported to key risk stakeholders.

4. *Review and Revision.* By reviewing entity performance, an organisation can consider how well the enterprise risk management components are functioning over time and determine what revisions are needed.

5. *Information, Communication, and Reporting*. Enterprise risk management requires a continual process of obtaining and sharing necessary information, from both internal and external sources, which flow up, down and across the organisation.

The five components described defined the COSO framework and are supported by a set of 20 principles (figure 2-2). These principles cover areas from governance to the monitoring component; they are said to be manageable in size and can be applied in different ways for different organisations regardless of size, type, or sector. What can be delivered through the adherence to these principles is the ability to provide the management and the board with a reasonable expectation that the organisation understands and strives to manage the risks associated with its strategy and business objectives.

2.2.1.2. Risk Management principles and guide ISO 31000

The Risk Management principles and guide ISO 31000 was published in 2009 as an internationally approved standard for the implementation of risk management principles (ISO, 2009). In 2018 a new version ISO 31000:2018 was published said to provide a clearer, shorter and more concise guide that will help organisations use risk management principles to improve planning and make better decisions. This second edition (ISO31000:2018) replaces the first edition (ISO 31000:2009) which has been technically revised (figure 2-3). The main changes compared to the previous edition are (International Standards Organisation, 2018):

- The review of the principles of risk management;
- The highlighting of the leadership by top management and the integration of risk management, starting with the governance of the organisation;
- The emphasis on the iterative nature of risk management, noting that new experiences, knowledge and analysis can lead to a revision of process elements, actions and controls at each stage of the process; and
- The streamlining of the content with greater focus on sustaining an open systems model to fit multiple needs and contexts. (Fox, 2018; International Standards Organisation, 2018).

Risk Management Principles and Guidelines ISO31000 provides a generic guideline and is not intended to impose uniformity of risk (Fraser & Simkins, 2010). The design and implementation of risk management is therefore dependent on the varying needs of a specific organisation; its particular objectives, context, structure, products, services, projects, operational processes and specific practices employed (International Standards Organisation, 2018; ISO, 2009) .
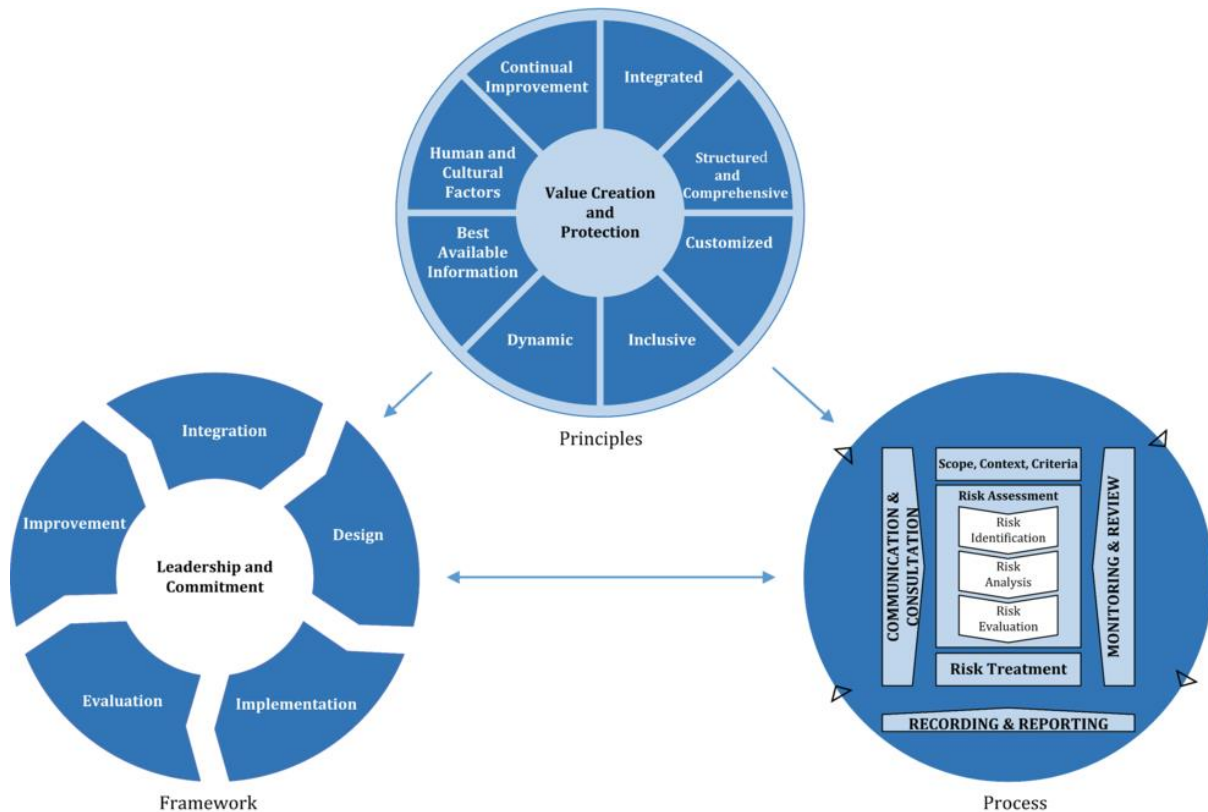
Figure 2-3 Risk Management Principles and Guideline – ISO31000:2018(International Standards Organisation, 2018)

This research places more emphasis on ISO 31000 as it is an international standard and many organisations have international operations. ISO is currently regarded as best practice for risk management frameworks and incorporates best practice from COSO (Fraser & Simkins, 2010). In addition to that the standard has an open system model to fit multiple needs and context, therefore ISO 31000 can be used as a reference when developing a dynamic risk management framework.

ISO 31000 includes a detailed list of the suggested principles for risk management. These have been identified as:

- *Integrated* - Risk management is an integral part of all organisational activities;
- *Structured and comprehensive* - A structured and comprehensive approach to risk management contributes to consistent and comparable results;
- *Customized* - The risk management framework and process are customized and proportionate to the organisation's external and internal context related to its objectives;

- *Inclusive* - Appropriate and timely involvement of stakeholders enables consideration of their knowledge, views and perceptions. This results in improved awareness and informed risk management;

- *Dynamic* - Risks can emerge, change or disappear as an organisation's external and internal context changes. Risk management anticipates, detects, acknowledges and responds to those changes and events in an appropriate and timely manner;

- *Best available information* - The inputs to risk management are based on historical and current information, as well as on future expectations. Risk management explicitly takes into account any limitations and uncertainties associated with such information and expectations. Information should be timely, clear and available to relevant stakeholders;

- *Human and cultural* - Human behaviour and culture significantly influence all aspects of risk management at each level and stage; and

- *Continual improvement* - Risk management is continually improved through learning and experience.

ISO 31000 states that risk management is a process that is underpinned by a set of principles that need to be supported by a structure that is appropriate to the organisation and its external environment or context (International Standards Organisation, 2018; ISO, 2009).

2.2.2. Risk Management Principles

The main principle of risk management is that it delivers value to the organisation (Hopkin, 2012). In other words, risk management activities adopted by the organisation should be designed to achieve the best possible outcome and reduce volatility or uncertainty of outcomes. The approach of risk management in an organisation is framed around the purpose of the risk management within the organisation (Hopkin, 2012). The set of risk management principles therefore sets out the foundation for a successful approach to effective risk management. In order for an organisation to understand the characteristics of risk management and what it is to deliver on, risk management practices would then operate on a set of principles.

A good set of risk management principles is the foundation to a successful approach to risk management in an organisation. Risk management principles define the essential features of

risk management, describing what risk management should be in practice but it also includes information on what risk management should do or deliver. It is therefore useful to differentiate between i) the characteristics of risk management and ii) what it should be delivering when adopting or developing a risk management framework (Hopkin, 2012)

2.2.3 Risk Management Process

The risk management process should be an integral part of management and decision making, integrated into the structure, operations and processes of the organisation. The risk management process should be applied at strategic, operational, programme or project level, so as to achieve the objectives of the organisation (International Standards Organisation, 2018). The risk management process should be customised to suit the context of an organisation both internally and externally (Nair et al., 2013).

The risk management process is a systematic process that involves activities of communicating and consulting, establishing the context; and assessing, treating, monitoring, reviewing, recording and reporting of risk (International Standards Organisation, 2018). Essentially explained the risk assessment involves the process of:

- **Step 1** – Scope, context and criteria. The purpose of this step is to gain an understanding of the internal and external context of the organisation, understanding the environment in which the organisation operates as well as apprehending the key business processes within the organisation. This process allows an organisation to understand its relationship with the environment in which it operates so that the boundaries or manner in which risk is dealt with are clear and relevant to the organisational and strategic context.
- **Step 2** – Risk assessment. This process entails:
- Identification of risks. This step involves identifying what can go wrong as well as the impact (consequence) the risk may have. In addition to that this process allows for the nature and complexity of the risks to be understood taking into account the events that might create, enhance, prevent, degrade, accelerate or delay the achievement of objectives.
- Analysis of risks. The risk analysis step involves analysing the impact and likelihood of a risk while also deciding which risk factors will potentially have the greatest effect and should, therefore, receive priority regarding how the risk will be managed. The level of

risk is analysed by combining estimates of likelihood (table 2-1) and impact (table 2-2), to determine the priority level of the risk (Figure 2-4).

- Evaluation of risk. This involves comparing the level of risk found during the analysis process with previously established risk criteria, and deciding whether risks can be accepted. If the risk falls into the low or acceptable categories, they may be accepted with minimal further treatment (step 4). These risks should be monitored and periodically reviewed to ensure that they remain acceptable. If risks do not fall into the low or acceptable category, they should be treated using one or more of the treatment options considered in step 4.

			Impact (Consequences)				
			1	2	3	4	5
			Insignificant	Negligible	Moderate	Extensive	Significant
	E	5 Almost certain	6	7	8	9	10
	D	4 Likely	5	6	7	8	9
Likelihood	C	3 Possible	4	5	6	7	8
	B	2 Unlikely	3	4	5	6	7
	A	1 Rare	2	3	4	5	6

Very High(VH)	Immediate action required by the Executive with detailed planning, allocation of resources and regular monitoring
High(H)	High risk, senior management attention needed
Medium(M)	Management responsibility must be specified
Low(L)	Monitor and manage by routine procedures
Very low(VL)	Managed by routine procedures

Figure 2-4: Risk Matrix (Julian, 2011)

Table 2-1:– Likelihood Scale

Rating	LIKELIHOOD The potential for problems to occur in a year
E	ALMOST CERTAIN: will probably occur, could occur several times per year
D	LIKELY: high probability, likely to arise once per year
C	POSSIBLE: reasonable likelihood that it may arise over a five-year period
B	UNLIKELY: plausible, could occur over a five to ten year period
A	RARE: very unlikely but not impossible, unlikely over a ten year period

Table 2-2: – Impact Scale

Rating	POTENTIAL IMPACT In terms of the objectives of the club
5	SIGNIFICANT: most objectives may not be achieved, or several severely affected
4	EXTENSIVE: most objectives threatened, or one severely affected
3	MODERATE: some objectives affected, considerable effort to rectify
2	NEGLIGIBLE: easily remedied, with some effort the objectives can be achieved
1	INSIGNIFICANT: very small impact, rectified by normal processes

- **Step 3** – Risk treatment. This involves identifying the range of options for treating the risk, evaluating those options, preparing the risk treatment plans and implementing those plans. It is about considering the options for treatment and selecting the most appropriate method to achieve the desired outcome. The treatment option may be the acceptance of a risk, the avoidance of a risk, the transfer of a risk or the reduction of a risk. Whichever treatment option selected, should the risk have a high rating, a careful consideration of the necessary organisational policies, procedures and strategies to treat the risk needs to be made.

- **Step 4** – Monitoring and review. As with communication and consultation in ISO31000, monitoring and reviewing are an ongoing part of risk management. The purpose of

monitoring and reviewing is to improve and/or ensure that processes are adequately designed, implemented as intended and that the process delivers on the intended outcomes (International Standards Organisation, 2018). Monitoring and reviewing include planning, gathering and analysing information, recording results and providing feedback. The results of the monitoring and reviewing should therefore be incorporated throughout the risk management process.

- **Step 5** – Recording and reporting. The risk management process and its outcomes should be documented and reported through the appropriate channels and audience using the appropriate artefacts. The purpose of reporting and recording is to ensure that the risk activities and outcomes are communicated across the organisation, providing information for decision making (International Standards Organisation, 2018).

2.2.4. Risk Culture

Building the risk culture of an organisation is often overlooked and presumed to create risk awareness. This is more likely to make employees of the organisation more risk averse, which is not the appropriate risk posture for an organisation (Shinkman & Herd, 2014). How risk is managed, perceived and treated is largely a cultural aspect within an organisation. What organisations should be striving for is getting each person within the organisation thinking as a risk manager, driving a culture of appropriate risk taking (Shinkman & Herd, 2014).

An organisation's risk appetite is accessed by the organisation's attitude towards risk as well as its risk tolerance levels. The organisation's risk appetite informs the level of change and innovation that an organisation is willing to take on. Inherently, in an agile organisation, risk attitude may be defined as risk seeking, being comfortable with inherent variability or uncertainty and having a desire to increase the risk exposure where appropriately priced. The risk tolerance of an agile organisation would therefore inherently be defined as being moderate, where the level of exposure to each risk type is expressed.

Perception of risk (good or bad) determines how much risk (positive risk - opportunity) an organisation is willing to take. In addition to that the culture of the organisation may also set the tone for the level of risk that it is willing to undertake.

2.3. Organisational Structures

2.3.1. Conventional / Traditional Organisations:

The nature and importance of organisation structures and the underpinning design principles are not well understood and yet they play a key role in organisational performance (McMillan, 2002).

Mabey, Salaman & Storey (2001) describe the structure of an organisation as the pattern of relationships between roles in an organisation and its different parts. Structure enables managers to plan, direct, organise and control the activities of the organisation (Mabey., Salaman., & Storey, 2001). Handy (1993) points out that it is a long held assumption that organisations need to follow a hierarchical command structure for them to work. Fayol (2016), the beginning of the 20th century, advocated an organisational structure that was centralised, functionally specialised and hierarchical, in which everything had a specific place. Management is viewed as being all about planning, organising, forecasting, co-ordinating and controlling (Fayol, 2016). To foresee and provide entails examining the future and drawing up the plan of action. To organise entails building up the dual structure, material and human, of the undertaking. To command entails maintaining activity among the personnel. To co-ordinate entails binding together, unifying and harmonizing all activity and effort. To control entails seeing that everything occurs in conformity with established rule and expressed command. Management is neither a privilege nor a particular responsibility of the head or senior members of the business; it is an activity spread, like all other activities, between head and members of the business therefore management should not be confused with government (Fayol, 2016).

The basic organisational structure of many large organisations in the 20th century was founded on linear, segmented, hierarchical design principles as stated in figure 2-5.
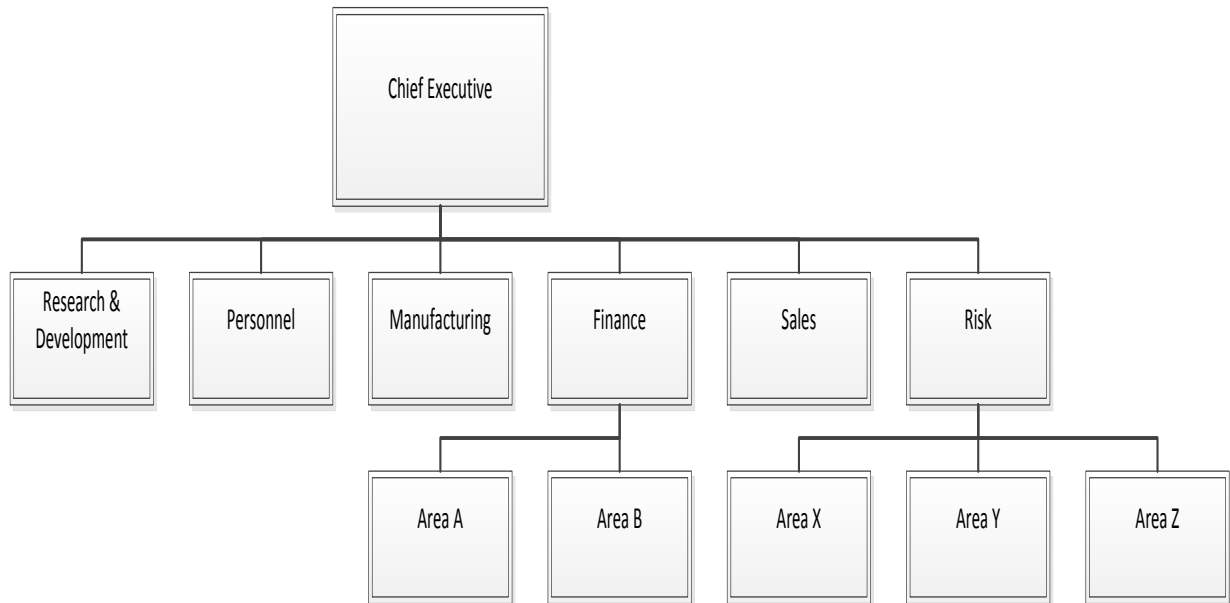
Figure 2-5: Traditional Organisational Chart / Structure (adapted from Weinshall, 1971, in Handy, 1993)

During the mid-20th century organisations created large corporate structures. This was done across many industries and sectors (Mabey, Salaman, & Storey, 2001). The management of these organisations required a complex multi-layered structure with many sub-divisions. Mabey, Salaman & Storey (2001) write that tall physical structures were constructed with 20-plus levels between the chief executives and the shop floor operative, creating hierarchies of command and control of employees. Managerial control of employees at all the multiple levels was based on a blend of direct command and budgetary responsibility.

Less traditional organisations have now merged and because of the need to respond to the market and customer needs, traditional organisational systems are under strain. As a result traditional organisations are struggling to keep up with their customers. Workers caught between unhappy customers and uninspiring leaders are becoming disengaged. Executives are caught between discontented investors and disruptive competitors and the entire organisation is struggling to integrate disruptive technology with legacy solutions to find a path forward. People working for traditional organisations are striving for a better work experience and a better world for themselves and their communities and are looking to new ambitious organisations to shape their collective future.

2.3.2. Agile Organisations (AO)

2.3.2.1. Agile in the Domain of Software Development (ASD)

Agility is a concept that came into existence and gained attention in the space of software development due to the perceived rigid, systematic, methodical, process and plan-driven approach that has been followed by the waterfall model which do not allow for much flexibility in terms of the planning, development, testing and implementation of systems and thus result in a "big bang" approach when it comes to the implementation of a product (Moran, 2014).

Agile software development (ASD) emerged in the late 1990s to address the uncertainty of customer requirements, technology evolution, and changing business environments. ASD approaches rejected the highly-formalized thinking of the time in favour of dynamic, user-centric methods characterized by short development cycle iterations, continuous releases, rapidly evolving requirements, dynamic underlying data, and reflection (Fowler & Highsmith, 2001; Schwaber & Beedle, 2001). Influenced by the school of iterative development and incremental delivery (Moran, 2014); in comparison with more traditional development methods that follow a more linear process (where each phase is commenced only when the previous phase is complete i.e. analysis, design, test and implementation), ASD therefore develops and delivers solutions in an iterative and incremental manner.

ASD encourages the uncovering of better ways of developing software because while there is value in having processes, tools, comprehensive documentation and followed plans there is much greater value placed on agility. Therefore four core values have been defined within the agile manifesto (Beck, Beedle, Bennekum, & Cockburn, 2001; Fowler & Highsmith, 2001) namely:

1. The value of individuals and interactions over processes, enforcing continuous interaction by individuals rather than extensive use of processes and tools;
2. The value of working software over documentation, learning from past experiences rather than concentrating on comprehensive documents that may be more geared to governance processes;
3. The value of customer collaboration over contract negotiation, ensuring that there is customer collaboration during the development process; and

4. The value of adapting to change over following a plan, being flexible in order to respond to change.

Equally important to the four ASD values are the 12 principles defined within the Agile manifesto (Beck et al., 2001) that emphasize:

1. Continuous delivery, satisfying the customer through prompt delivery of valuable software;

2. An attitude of embracing change by welcoming changing requirements even late in the development cycle. Harnessing change for competitive advantage;

3. Frequent delivery of functional components;

4. Daily interaction with business stakeholders throughout the project;

5. Empowerment of individuals through trust and support, building solutions around motivated individuals who know they are trusted to deliver the required solutions;

6. Conveying information in a more efficient and effective manner through direct communication (face-to-face conversations);

7. Measurement of progress through functional software;

8. Sustainability whereby the sponsor, developer and users maintain a constant pace indefinitely;

9. Continuous excellence of design, with a focus on technical excellence;

10. Simplicity through minimalism;

11. Self-organisation of teams; and

12. Team reflection at regular intervals in order to become more effective.

These 12 principles (Beck et al., 2001) speak to the way in which the work is done, the behaviour to be adopted, the attitude as well as the discipline required in agile software development which is often underestimated (Boehm & Turner, 2003a).

Referring to the 12 principles and the 4 core values of ASD, ASD not only impacts on *how* solutions are developed and delivered to the business, but also impacts the organisation from a culture and values perspective, posing a question as to whether the organisational values and principles are aligned to the new ways of working (NWoW) brought about by ASD. In addition to that, the behavioural aspect of people when considering ASD is also important to consider because this triggers concerns about how people take on accountability and

responsibility, their ability and comfort with engagement, their perception of change, level of transparency and their response to quality and deliverables (Fowler & Highsmith, 2001).

2.3.2.2. Agile Systems Development's Holistic Impact on Organisations

The Agile Manifesto expresses the view that interaction between project teams and the business should work towards producing software in a flexible manner that is open to change, transparent in nature and allows for learning. Thus, learning and communication are key factors of ASD, prompting the continuous engagement between stakeholders (Fowler & Highsmith, 2001). ASD promotes the idea that project uncertainty should be embraced by a business and a balance between planning and control as well as with execution and feedback need to be reached (Moran, 2014). Based on the flexible and interactive nature of ASD , project teams are therefore required to interact at a much greater scale with the business, (Boehm & Turner, 2003b) and for that reason they have a great responsibility in delivering what the business wants hence the need for discipline and transparency in the ways of work.

ASD has an impact on the responsiveness of an organisation; it drives the needs of the customer through agile processes. As a result traditional organisations that have adopted such a product development process gain more organisational agility because of their increase responsiveness to market needs (Boehm & Turner, 2003b).

2.3.2.3. Agile Values and Principles Aligned to Risk Management

The term "agile" can be thought of as a descriptor of both quickness and responsiveness when faced with internal and external events or stimuli. Although many enterprises understand the need to be quick and responsive in a global economy and in a market that is constantly changing, many are not structured to do so (Ambrose & Morello, 2004). Agile processes harness change, so as to allow for agility that may have an impact on customer competitive advantage. Rather than resisting change, agile approaches strive to accommodate change in an easy and efficient manner while being aware of the consequences (Fowler & Highsmith, 2001). For that reason, risk management becomes a vital practice within agile organisations, being robust and flexible to harness this and partnering with business and project management in an attempt to prevent threats that may impact on objectives of the

organisation as well as identifying opportunities that would assist business in meeting the customer needs (Nyfjord & Kajko-Mattsson, 2007a) .

Referring specifically to the four ASD values:

- Value 1. The value of individuals and interactions over processes, enforcing continuous interaction by individuals rather than extensive use of processes and tools.

Agile teams are generally small, comprising of individuals that can engage in several types of work namely: analysis, development and testing. This allows for quick response to change and ease of maintenance of systems developed in response to customer needs. ASD team structure is regarded as "organic and flexible" rather than "mechanistic, bureaucratic and formalized" (Nerur, Mahapatra, & Mangalaraj, 2005).

- Value 2. The value of working software over documentation, learning from past experiences rather than concentrating on comprehensive documents that may be more geared to governance processes;

Spending less time documenting tasks and features so as to aid in the speedy delivery of working software (Fowler & Highsmith, 2001). What is not clear is whether communication methods help the ASD team make decisions when there is less documentation on which to rely.

- Value 3: The value of customer collaboration over contract negotiation, ensuring that there is customer collaboration during the development process.

The project manager's role as a decision-maker is greatly reduced to being more of a facilitator or coordinator (Nerur et al., 2005) who works with the customer and the team. Customer interaction is vital to facilitate agile development in obtaining input from a customer perspective, which is in contrast with the pre-agile or traditional approaches e.g. waterfall. The level of customer engagement is higher than that of the more plan-driven approaches. The team makes most decisions, creating a "pluralist decision making environment" (Nerur et al., 2005) due to the diverse backgrounds, attitudes, goals, and cognitive dispositions of the team members, including the customer (Highsmith, 2003; Highsmith & Cockburn, 2001).

- Value 4. Adapting to change over following a plan, being flexible to respond to change.

The fourth value expresses the need for adapting to change over following a plan and being flexible in order to respond to change. This would means that the iterative, incremental nature of ASD with frequent product releases enables teams to adapt and respond quickly (Dybå & Dingsøyr, 2008)**.**

For organisations that have adopted ASD, the successful implementation of such a methodology requires executives and top managers to be able to sense key development trends in order to respond to the changing environment in such a way that that they are able to lead the organisation in the path that is forward-looking but open to learning. As a result organisations with a highly developed culture of agility are more able to quickly respond to market conditions, be it threats or opportunities (Burba, 2015). Agility fundamentally affects decision making (Henderson-Sellers & Serour, 2005) thus impacting on how risk is managed. Quick and relevant decision making, being a factor that management has to consider while operating in uncertain environments, requires that risk management practices are in line with such needs so as to identify threats and opportunities that may impact the decision making process.

Agile models claim to be risk-driven, having risk-mitigation mechanisms built within agile methodologies with the intension of reducing project risk however it is questionable whether the risk management practices are sufficient or whether explicit risk management is required so as to drive risk management within the organisation as well as the impact of change (Walczak & Kuchta, 2013).The scarcity of explicit risk management practices in agile development practices is a concern as the level of risk management applied in agile development is not sufficient for the organisation's enterprise risk management needs (Walczak & Kuchta, 2013).

The perception of risks in agile organisation and organisations that intend on becoming agile needs to be aligned to the principles of agile. With that said an agile organisation's attitude or perception of risk may be less adverse. Nyfjord (2008) in his research outlines a model which integrates risk management and agile development (figure 2-6), first examining the agile processes from a risk management perspective so as to identify the risk management aspects that are absent in the agile model (Nyfjord, 2008).
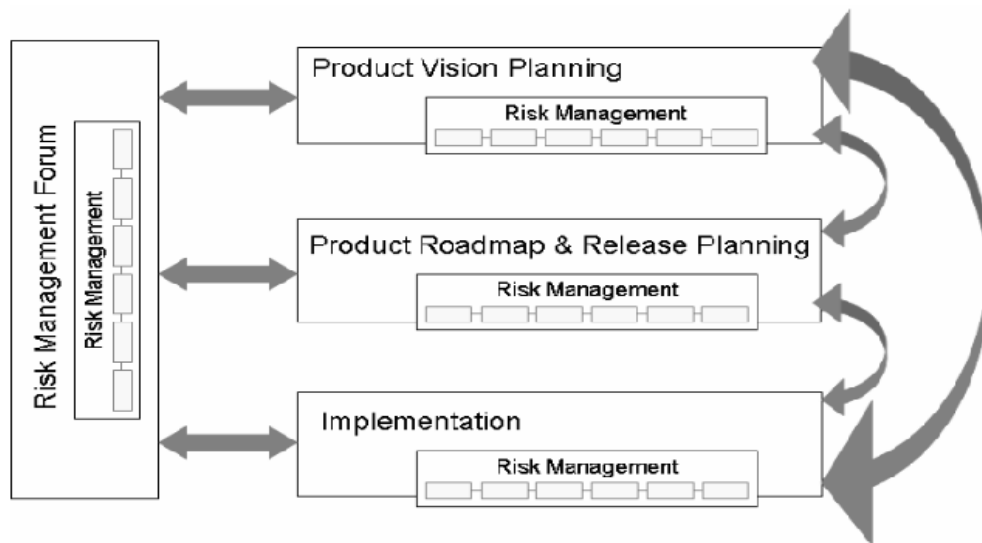
Figure 2-6: Integrated model by Nyfjord (2008)

The integrated model (figure 2-6) as defined by Nyfjord (2008) looks at the management of all risks identified in the agile development lifecycle on an organisation-wide perspective. As depicted in Figure 2-6, the agile process covers three main development phases: Product Vision Planning, Product Roadmap and Release Planning, and Implementation. In each process a complete risk management process is performed namely: risk planning, risk identification, risk analysis, risk monitoring and control, risk sign-off and risk post-mortem analysis (Nyfjord, 2008). Risks not fully managed or mitigated within a single phase are transferred to the next phase, and/or get reported to an organisational function called Risk Management Forum (RMF). This transfer is represented by the double-edged arrows between the three agile development phases and the box representing the RMF on the left-hand side of Figure 2-6. The Risk Management Forum's main function is to coordinate risk management across the organisation and it manages any risks that cannot be managed within a certain development phase.

Nyfjord(2008) states that the integrated model was considered to fulfil its purpose as a reference model. The integrated model is regarded as useful for organisations interested in comparing their risk management practice with their agile processes. The integrated model's utility is considered as limited by Nyfjord (2008) as it does not prove guidelines on how to actually conduct agile risk management. As a result it was suggested that the integrated model should be extended with guidelines on how to conduct agile risk management (Nyfjord & Kajko-Mattsson, 2008).

2.3.3. Virtual Organisations (VOs)

2.3.3.1. Virtual Organisations' (VOs) Make-up

In today's world, organisations are required to operate in a global marketplace with the abilities to become efficient in meeting the needs of the customer and maintain competitive advantage. This need gave rise to the range of organisation strategies in terms of corporate transformation which includes downsizing and re-engineering, and, in turn, the concepts of the Virtual Organisations (VO) where each of the components within the company are built around expertise and specialist knowledge (Franks, 1998).

The advancement of information communication technology (ICT), the need for organisational agility, the evolution of the Internet and the increasing demand for high productivity to meet customer demands has motivated different organisations to come together and explore business opportunities (Nami, 2008). The cooperation and collaboration of these organisations is supported by computer networks. The Internet and related technologies are used as a means of communication and collaboration. This would entail having virtual teams with various areas or structures in the organisation existing through information technology which supports work and communication (Lipnack & Stamps, 1997).

The components that make up a virtual organisation: individual employees, teams, departments, units or firms are geographically distributed, functionally or culturally diverse, electronically linked and connected via lateral relationships. These attributes enable the organisation to dynamically modify business processes to meet market demands, to coordinate via formal and informal contracts, to define the boundaries of the firm differently over time or for different customers or constituencies, and to re-arrange relationships among components as needed. Virtual organisations (VO) do not represent the traditional firm's attributes, but can be considered as a different organisational form and are characterized by:

- Highly dynamic processes;
- Contractual relationships among entities;
- Edgeless, permeable boundaries; and
- Reconfigurable structures (Desanctis & Monge, 1998).

The term virtual organisation implies that an innovative relationship exists between organisations that have partnered to form a VO (Nami, 2008). These organisations are supported by the use of technology and therefore fit a globalization profile. In this type of organisation, the VO's costs, skills, and access to global markets are shared, contributing to (Pedersen & Nagengast, 2008):

- Excellence, where each partner brings core competence;
- Technology, as the partnership is based on electronic contracts and the informational networks;
- Opportunity, facilitating market opportunities; and
- Trust as this type of organisational structure makes each organisation far more reliant on the other, creating no fixed boundaries between the organisations.

The major distinction between virtual and other organisations, particularly traditional organisations is that VOs are electronically driven, led and structured beyond the boundaries of conventional organisations. These boundaries may have been set by geographical boundaries, a lack of diversity in skills and knowledge (human capital) as well as the advancement in technology. VO's are more likely to be adaptable to change, flexible to change situations or circumstances and responsive to quick changing market and market conditions. Consequently VOs have three key features namely:

- Limited physical facilities / structure (Pedersen & Nagengast, 2008);
- Reliance on high-technology communications networks to allow for remote communication (Pedersen & Nagengast, 2008); and
- Effective knowledge management (Franks, 1998).

Having explored the features of a VO, several operational factors have been identified. These factors include human capital, communication, cultural, interpersonal, technological and economic conditions.

- *Human Capital.* The principle of ''human capital'' is now a widely applied concept in today's business environment and many companies recognize human capital as a decisive factor in their success (Luthans, Luthans, & Luthans, 2004). Work design is a critical concern for managers because it bears directly on performance. How a

company arranges work has a direct bearing on productivity, quality, cost, profits and customer satisfaction. Virtual teams are a construct of different team members who are based at different locations. Virtual teams within VOs operate beyond the limitations of time, distance, organisation size and technologies because telecommunication technology can allow team members to communicate with one another via computer conferencing systems, Internet-based virtual meeting systems and electronic meeting systems (Lu, 2015). Virtual teams can therefore have an infinite number of participants through the use of technology because network technology and groupware enable the sharing of information across participants. Virtual organisations are able to effectively mobilize a large number of employees through the assembly of virtual teams and anonymity is a major element of such an organisation (Pedersen & Nagengast, 2008). This means that interaction can be designed to conceal the identities of those involved in the virtual team and even to conceal the existence of the team itself, significantly reducing the limitations and the problems of the traditional team. A traditional team may be more vulnerable to security problems as it is often based on face-to-face meetings (Pedersen & Nagengast, 2008)

- *Communication.* Communication is crucial to the success of a VO because communication provides VOs with the ability of being efficient and is fundamental to the organisation's survival. Virtual organisations imply various autonomous and international workers, which also indicate challenges such as different time zones and language barriers. The collaboration between associates might also become complicated as this organisation typically has a limited amount of face-to-face interaction. Thus, an absence of multiple communication approaches can be observed in virtual organisations (Lee, 2013).

- *Culture*. Culture constitutes an essential element in any organisation of any type. Yet, virtual organisations have to be even more vigilant about this notion as they imply a shared leadership between the team which is composed of self-reliant workers from all around the world. Virtual organisations must find a way to overcome cultural differences, which involve dissimilar approaches to working (such as time and deadlines) and living (punctuality for instance), in other words, distinctive philosophies. Thus, virtual organisation must exercise respect for differences among the team (Lee, 2013)

- *Interpersonal.* Managing VOs successfully requires a valuable communication and cooperation strategy among the team. Perceptions between partners might be quite dissimilar and could lead to conflicts concerning the management of the virtual organisation. Thus, it is more than necessary that associates build a solid relationship despite the distance obstacle (Lee, 2013). Trust is also a crucial matter as a shared leadership among co-workers consequently implies the loss of control of certain functions entrusted to other associates (Byrne, 1993).

- *Technological.* Virtual organisations are completely dependent on technology as they are entirely internet-based. It is more than necessary for the individuals involved in a partnership to possess similar technological tools to its associates. Security and data protection also constitute a significant challenge as all the information regarding virtual organisations are transmitted and gathered digitally (Lee, 2013). A continuous control and evaluation of the technology utilized should be done by virtual organisations in order to prevent being outdated and losing opportunities.

- *Economical.* Virtual organisation involves considerable costs due to high reliance on technology as well as the performance and availability requirements of the organisation in addition to that between the setup and equipment costs and the maintenance costs, the bill can escalate quickly. It also constitutes a challenge to measure, evaluate and track the work done within the different departments in the virtual infrastructure. This might lead to partners missing deadlines, the necessity to rework and therefore a loss of efficiency and profit (Lee, 2013)

Taking these factors into consideration, the benefits of VO for both the organisation as well as the employee can be seen or experienced in terms of the organisation's ability to compete and accordingly maintain their competitive advantage within the market place.

2.3.3.2. VOs' Organisation and Working

Virtual organisations come in many shapes and sizes and there is no typical structure that defines a VO; each VO is a unique construct

From the research of Stough, Eom & Buckenmyer (2000) the following characteristics of a virtual team are defined:

- *Transcendence*. Virtual teams can transcend time, distance, organisation, size and technologies because telecommunications technology can allow team members to communicate with one another via computer conferencing systems, Internet-based virtual meeting systems and electronic meeting systems.

- *Infinity*. Virtual teams can have an infinite number of participants. Network technology and groupware enable the participants from anywhere in the world to share information in a data server. Infinity enables virtual organisations to effectively mobilize a large number of employees to assemble virtual teams.

- *Anonymity*. A virtual team enables its members to keep their participation anonymous. It can be designed to conceal the identities of those involved in the virtual team and even to conceal the existence of the team itself. These characteristics can significantly reduce the limitations and the problems of the traditional team. A traditional team may be more vulnerable to security problems, as it is often based on face-to-face meetings.

Although members of VOs connect and interact virtually and are not co-located, the success of VOs is in the shared determination and interdependent business processes that are designed to achieve shared business objectives. Thus it is important that VOs create a common value chain among the distinct entities of the VO (Benjamin & Wigand, 1995; Rayport & Sviokla, 1995), as well as the business processes supported by distributed information technology. Employees within VOs allow for more independency working, where individuals can work in a manner that is satisfactory to them. Therefore, the degree of dissatisfaction and stress or even pressure experienced in conventional organisations can be far less in VOs.

In summary, virtual Organisations (VO) offer great advantages in terms of flexibility if successfully applied. The collapse of VOs can be enormous if consideration is not given to the reality of the environment, time, conditions and circumstances in which organisations operate.

2.3.3.3. VO in the Context of Risk Management

The integrated and coordinated approach towards knowledge, technology and relationship management is essential to VOs (Walters, 2000). Virtual organisations are in most instances

good at identifying their own core competencies, deciding where in the value-chain these are to be most cost-effectively deployed, and complementing these with partnership opportunities, which is regarded as being one of the key success factors. From a process perspective, to ensure continuous efficiency and delivery the VOs are required to continuously consider business processes that will enhance their level of efficiency.

From an organisational structure and design perspective, despite the advantages for VO (both organisation and employee), it can be quite challenging to those familiar with a conventional work group to lead as a virtual organisation. Thus, large risks are associated with the challenge of working virtually as this new organisational structure implies several issues. Considering the reliance this type of organisation has on technology, this perception may be that challenges only come from the technology management. As much as information technology offers an efficient and largely beneficial platform, when looking at virtual organisations the following critical success factors need to be considered (Vakola & Wilson, 2004):

- Time and location - where the key characteristics of a virtual organisation rely on the concept of anytime, anyplace and anywhere;
- Levels of involvement - where the company may be working entirely on a virtual basis, depicting a high degree of involvement; and
- Technological advances - where new technology developments such as wireless, internet and multi-media applications, groupware, intelligent software agents and database systems, create new and flexible ways of working as well as a high level of information sharing.

VO's may be characterized by several of the same factors that determine a traditional organisation's risk profile but due to the inherent nature of VO, the risk management processes applied in such an environment need to be dynamic so as to cater for how it is structured.

VO's are distributed, networked organisations with fluid and shared business processes, so risk in the VO can migrate between organisational members, making risk identification and mitigation difficult (Grabowski & Roberts, 2006). How risk management processes are implemented within a VO may therefore be fundamentally different from a traditional organisation, requiring a much more dynamic risk management approach. Risk management

in VOs should therefore take into consideration the characteristics focused on the nature of VOs as well as their functioning, these being the geographical distribution, organisational structuring and design, the communication processes, trust and the organisational culture.

2.3.4. Exponential Organisations (ExO)

2.3.4.1. Exponential Organisations' (ExO) Make-up

In today's new world, an organisation's size, age, reputation or current sales may not be determining factors as to whether an organisation will continue to exist. Exponential organisation (ExO) exists, creating an environment where one can build organisations that are sufficiently scalable, fast-moving and smart, enjoying the success of exponential growth and success to a degree that has never existed before or even considered as being possible, especially when considering the minimal resources and time that are at the disposal of the organisation (Ismail, Malone, & van Geest, 2014).

We have now entered an era wherein start-up organisations are being developed which, within short periods, grow and become large organisations, growing and moving at light speed and attracting a large share of the market. Conventional organisations, having been in existence for many decades, struggle with the fast growth and dynamic nature of these light speed organisations and many, not having transitioned into an ExO are now be faced with the challenge of maintaining their competitive advantage. Start-up organisations are now capturing the market and have become recognisable competition to larger more traditional organisations. The lifespan of organisations is now becoming shorter and the large traditional organisations are now forced to compete with the upcoming start-up organisations that do not have the legacy issues that they are experiencing. This therefore poses a challenge to the larger and more traditional organisations in that they are now forced to move into a transformational space, transforming to become more agile, flexible and responsive to change like exponential organisations.

A new breed of organisations has now emerged, harnessing the power of exponential technologies, from groupware and data mining to synthetic biology and robotics (Ismail, Malone, & van Geest, 2014).The success of these ExOs is associated with the level of productivity and the speed at which they respond to market needs, as the market needs or

requirements have increased from what they were previously. Human productivity steered by good human resource practices has been identified as essential to business performance (Bhalla & Giri, 2014) and performance by employees has always been essential to business performance (Huselid, Academy, & Jun, 1995). Now the productivity of organisations is not determined by the number of people and the time they spend on delivering a task, it is more about the type of technology used as well as the capital expense deployed by the organisation.

To grow exponentially and span across the globe, twice the output is required to access and reach global markets as well as to potentially dominate the industry or sector in which an organisation operates. With that said, conventional organisations are often too internally focused and have often lost touch and are probably not as finely tuned to spot rapidly approaching technological or competitive threat.

ExOs extend themselves outside their organisational boundaries by leveraging or accessing people, assets and platforms to maximize flexibility, speed, agility and learning. These organisations are extremely robust, precise and properly tuned to process all the inputs and as a result produce exponential outputs. With that said ExOs have distinctly different internal operations, encompassing everything from their business philosophies to how employees interact with one another, how they measure their performance, and even their attitudes toward risk (Ismail, Malone, & van Geest, 2014).

The internal operations of an ExO are supported by various processes and activities (Ismail, Malone, & van Geest, 2014):

- Interfaces that are used to filter and match processes by which ExOs bridge external factors. In many cases these processes start out manual and gradually become automated around the edges. As these processes evolve and become more powerful, they feed into the organisation's dashboard using data as a key source;
- Dashboards. Given the huge amounts of data from customers and employees, ExOs need to measure and manage the organisation, real-time by using adaptable dashboards with all essential company and employee metrics and making it accessible to everyone in the organisation.
- Using Lean principles to develop and implement product.

- Autonomy. This is described by self-organizing, multi-disciplinary teams operating with decentralized authority. The company hires talented, innovative self-starters who decide which projects they wish to join. Employees are also encouraged to start new projects, so long as they fit the company's MTP (Ismail, Malone, & Geest, 2014); and

- Creating a work place that caters for digitization.

In a conventional organisation, strategies are drafted and defined for a period of three to five years but in an ExO such conduct is frowned-upon and is even said to be a suicidal practice for an ExO. This is because it is believed that long-term strategies may simply send the organisation hurtling in the wrong direction. These strategies at times may present an inaccurate picture of what lies ahead, even if it is in the right direction (Ismail, Malone, & van Geest, 2014).

Ismail (2014) states that an ExO is one whose impact (or output) is disproportionally large, at least 10x larger compared to its peers because of the use of new resources and capabilities. ExOs are built upon information technologies that take what was once physical in nature and dematerialize it into the digital, based on world-wide demand.

2.3.4.2. Exponential vs. Linear in the Context of Risk Management:

Regardless of how the landscape of organisations is changing in terms of form, structure, management and communication, many organisations today still manage and measure themselves on a linear scale. That is in terms of the amount of work it takes to complete a task and the resources required; yet the advancement of technology and accessibility of such technology changes this line through automation, mass production, robotics and even virtualization. This therefore means that traditional or conventional ways of building products or developing solutions have fundamentally changed and are not in adherence to the linear measures used. The unfortunate aspect of the linear measure is that it is still widely used, particularly by the much established and mature organisations yet it has long been abandoned in the world as new technologies have advanced (Burnes, 2017) .

The challenge that exists today when considering organisation agility is that organisations are viewed as non-linear systems, which then presents a problem regarding predictability (Millett, 1998). Linear processes are seen and used across large organisations yet external factors influencing organisations such as technology and market indicators are not on a linear,

more predictable path (Burnes, 2017). Organisations do not achieve success though because of their ability to predict and create planned strategies. They achieve success because of their ability to constantly realign with the environment (Millett, 1998). The linear process remains pervasive across the world economy; in software development processes the waterfall approach is considered to be linear while new development methods like Agile Software Development (ASD) have emerged and collapsed some of the steps. Many organisations are now adopting agile methodologies in organisations that still manage and measure using linear methods. Products developed using ASD are still released and deployed in a linear manner therefore linear product development remains the predominant way in which solutions are introduced to the market.

If organisations are complex systems, management and change take on a new dimension suggesting that, while it might be fruitful to see organisations as non-linear systems, to do so will require a fundamental shift in the role of management (Burnes, 2017). The challenge is mainly that because organisations think linearly, their operations are linear, and their performance and success measures are still linear. Most organisations see the world through a linear lens, which then means that when presented with an opportunity the approach followed to exploit these opportunities is linear so organisations tend to easily forfeit their competitive positioning (Ismail, Malone, & Geest, 2014) (Olmedo, 2010). In instances where these opportunities were exploited, they are measured in a linear manner. This may be the reason why organisations that are not exponential in nature are overtaken by the burgeoning dynamic organisations which are disruptive in nature. On the opposite spectrum exist conventional organisations that are linear and rarely disrupt their own products or services let alone the sector, industry or market because they do not have the tools, the attitude or the perspective to do so (Ismail, Malone, & Geest, 2014).

Looking at technology in terms of advancement and use, it has had a major impact on organisations and has introduced enormous disruption in the business world. The changes in the world as well as how organisations should be designed or structured or even the level of growth to be expected is rapidly becoming obsolete. Consequently organisations need to continuously refresh their knowledge and use of technologies as well as their organisational capabilities. Understanding an organisation's landscape is now becoming a very challenging task. What has always made traditional companies highly efficient at expansion and growth is that as long as market conditions remain unchanged, they had an opportunity to plan for the

future over a longer time. In the same breath this has made these organisations extremely vulnerable to disruption. Today the key issue is that we live in an exponential world, which means that whatever understanding one may have had or still has of the world and how it operates has fundamentally changed (Ismail, Malone, & van Geest, 2014).

From a risk perspective, this shift will, of course, be quite challenging in terms of risk management as risk management has always followed a more linear approach to the identification, assessing, managing and monitoring of risks (Boehm & Turner, 2005). Providing drawn-out projections of emerging risks within 18-24 months, tracking current risks and planning the improvement of the current controlled environment of an extended period of time adds to these challenges.

2.3.5. Organisational Structure Summary

In the 21st century, fewer traditional organisational forms began to emerge. Mabey, Salaman & Storey (2001) write of the emergence of a new paradigm for organisational form which seeks to replace the rigid and cumbersome nature of traditional form. Ashkenas (1995) presents the change in paradigm for organisational success, summarising the success factors of both old and new organisational designs as described by Ashkenas, this is depicted in Table 2-3.

Table 2-3: Design principles for Organisational Success (Ashkenas, 1995)

Old success factors	New success factors
Size	Speed
Role clarity	Flexibility
Specialisation	Integration
Control	Innovation

This therefore means that organisations designed and focused more on size, role clarity, specialisation and level of control (Ashkenas, 1995) are increasingly incapable of thriving or even surviving in the new world. The design of the organisations not only impacted the way in which reporting and management is done within an organisation but has had a fundamental

impact on the ways of work across an organisation, which in turn may have a direct impact on the success of the organisation.

The development of new technology influenced the design of early business and the way they were expected to function (McMillan, 2002). This is still true in today's times as the advancement in technology is shifting the way in which organisations operate within themselves as well as with their external environment. The shift in organisational design principles from old to new recognises speed, flexibility, integration and innovation as key success factors, all characteristics of responsive organisations These should be designed to thrive in less predictable environments; by balancing profit with purpose, hierarchies with networks, control with empowerment, planning with experimentation and privacy with transparency. Creating non-linear structures would be in support of non-hierarchical principles and assure the attainment of new success (McMillan, 2002).

Table 2-4 summarizes the organisational structures discussed in this section providing the definition of these organisations along with the success factors identified by Ashkenas (1995) for new organisational designs.

Table 2-4. Summary of organisational structures

Organisational Structures	Reference	Definition	Nature of organisations	Organisational Principles for Success (Ashkenas, 1995)			
			Linear vs. non-linear systems (Millett, 1998)	Innovation	Flexibility	Integration	Speed
Traditional / Conventional	(Mabey, Salaman, & Storey, 2001)	Traditional organisation with a structure that has a leader and multiple layers of subordinates or divisions	Linear				
Agile	(Fowler & Highsmith, 2001)	Agile organisation that is quick in responding to changes in the marketplace or environment as well as the emergence of new competitors	Non-linear	X	X	X	X
Virtual	(Pedersen & Nagengast, 2008)	Virtual organisation with virtual teams that is located throughout the country or the world requiring information technology to support their work and communication.	Non-Linear	X	X	X	X
Exponential	(Ismail, Malone, & van Geest, 2014)	Exponential organisation that has a larger growth (at least 10 times larger) compared to its peers because of they make use of new organisational techniques that leverage exponential technologies.	Non-Linear	X	X	X	X

2.4. Organisational Agility
2.4.1. The Concept of agility

Agility is a complex concept and has been analysed across economics, strategic management, operations management and information technology/information systems disciplines, building from the literature on flexibility in economics (Seethamraju, 2006). The concept was initially developed by a group of researchers in order to describe the practices that should be observed and considered as vital aspects of the manufacturing process (Nagel & Dove, 1991). These authors argued that organisations must adapt to the changing business environment and needs such as speed, flexibility, responsiveness and infrastructure with a manufacturing system that is capable of quickly shifting among product models and/or between product lines (Seethamraju, 2006).

The concept of adapting to unforeseen changes has led to the evolution of one of the latest concepts in business strategies and is referred to as the concept of agility (Ganguly et al., 2009). Agility has become a key business driver for all organisations is and a crucial factor in an organisation's ability to survive and thrive in uncertain and turbulent markets (Dove, 2001). The term 'agile' is commonly used to describe organisations that are able to adapt to and perform well in rapidly changing environments (Dove, 2001). In a similar way Teece and others (2016) refer to agility as the capacity of an organisation to efficiently and effectively redeploy or redirect its resources so as to create and protect its organisational value.

Taking a strategic management perspective, researchers (Sambamurthy, Bharadwaj, & Grover, 2003) defined business agility as the capability of firms to manage their internal operations and interactions with their ecosystems of external partners and networks. They identified three types of agility; namely, customer agility, partnership agility and operational agility. Customer and partnership agility deal with the agility of the firm in managing relationships with customers and partners while operational agility is defined as the ability of the firm to redesign existing processes rapidly and to create new processes in a timely fashion in order to be able to take advantage of dynamic market conditions. Agility therefore also builds upon other concepts in management theory that pertain to firm success in turbulent environments, including dynamic capabilities (Teece, Pisano, & Shuen, 1997).

2.4.2. Dynamic Capabilities and Agility

Faced with an ever-changing marketplace, organisations are required to act fast, creating organisational agility that allows for the implementation of solutions in a quick and iterative manner yet still applying solid foundation that safeguards the organisation from recklessness. In today's competitive environment is it more effective for an organisation to be accepting of and positively responding to change than attempting to prevent it. The environment under which organisations function is so volatile that each organisation should have the capability to plan for a disaster or unpredictable events than to remain stagnant in existing practices (Fowler & Highsmith, 2001). Organisations across sectors are striving for agility to penetrate their markets faster with products and solutions that are innovative and responsive to market demands (Ellonen, Wikström, & Jantunen, 2009). To achieve agility, organisations need to be able to transform themselves particularly when working in uncertainty while learning and adjusting needs to become a capability set that an organisation possesses (Teece et al., 2016). This therefore makes it imperative for organisations to develop and maintain mechanisms that will allow them to be more responsive yet be in a position to proactively and timeously identify risks that may impact on the organisation's goals.

2.4.2.1. The Dynamic Capabilities Framework (DCF):

In a fast-moving business environment open to global competition, organisations with a competitive advantage have been organisations that demonstrate timely responsiveness, flexible product innovation (Ellonen et al., 2009), along with the management capability to effectively coordinate and redeploy internal and external competencies (Teece & Pisano, 1994). This source of competitive advantage is referred to by Teece (1994) as 'dynamic capabilities'. It emphasizes two aspects: *firstly*, the shifting character of the environment and *secondly*, the key role of strategic management in appropriately adapting, integrating, and re-configuring internal and external organisational skills, resources, and functional competencies towards the changing environment. The dynamic capabilities approach provides a framework that highlights organisational and strategic competencies that can be used by the organisation to create competitive positioning that can be developed into a long term competitive advantage (Teece, 2007). The dynamic capabilities (Figure 2-7) can be separated into three main components of capabilities; namely, (1) to sense and shape

opportunities and threats, (2) to seize opportunities and (3) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets (Teece, 2007).

Framework for dynamic risk management in responsive organisations
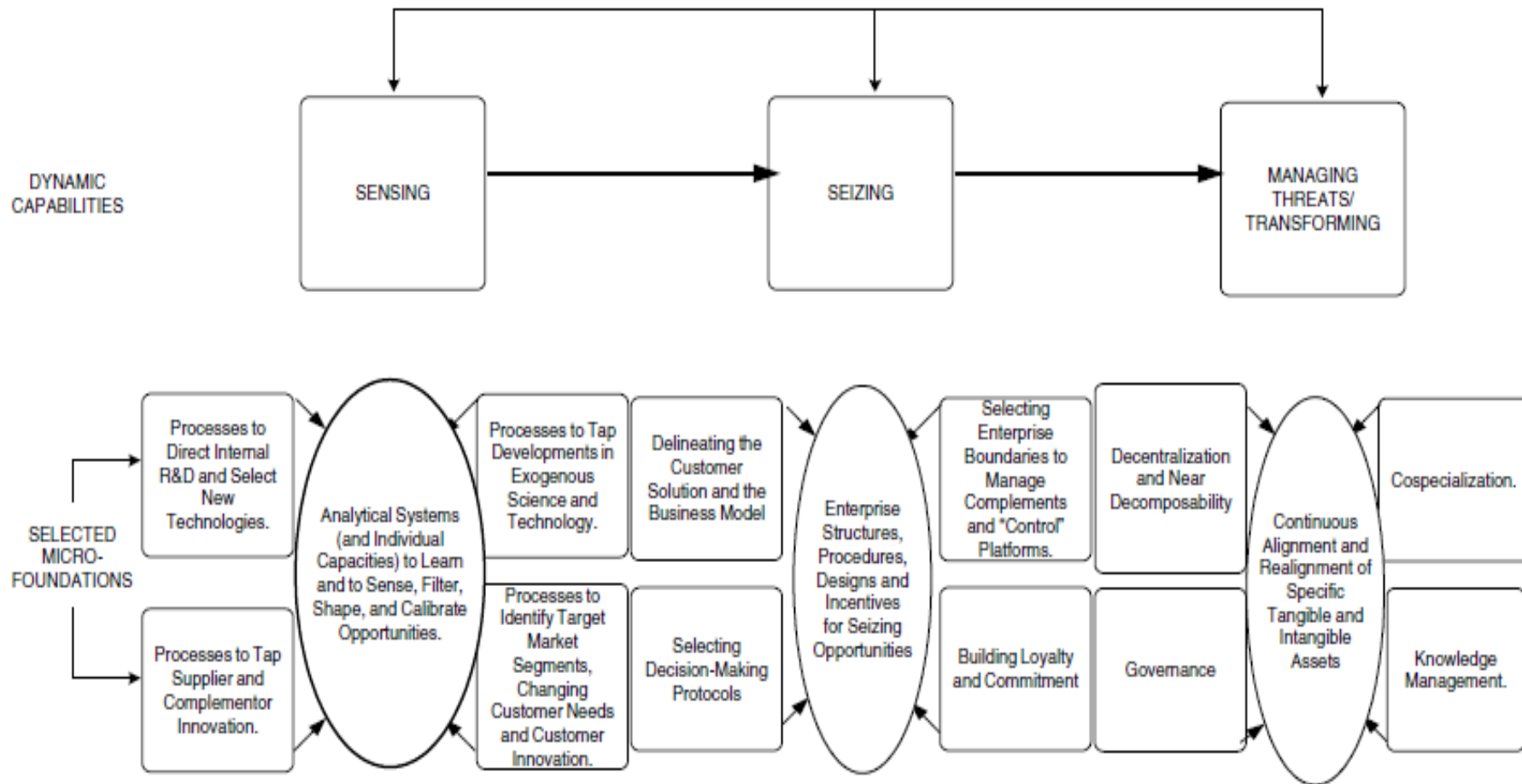
Figure 2-7: Foundations of dynamic capabilities and business performance (Teece, 2007)

The dynamic capabilities framework aims to explain the sources of enterprise-level competitive advantage over time, allowing the organisations to compete in perfectly competitive markets. The element of dynamic capabilities that involves shaping (and not just adapting to) the environment is dynamic in nature, these being the ability to sense opportunities, seize opportunities and manage threats and transformation discussed in the next sections (Teece, 2007).

- **Sensing (and shaping) opportunities and threats (figure 2-8):**

To identify and shape opportunities, organisations must constantly scan, search, and explore across technologies and markets. This activity involves investing in research activity and analysing customer needs as well as current technological possibilities. In order to build sensing capabilities, organisations need to understand the hidden demand, the structural evolution of industries and markets, and supplier and competitor responses. Opportunities emerge for all organisations therefore organisations must have the capability to interpret new events and developments, know which technologies to pursue, and which market segments to target.
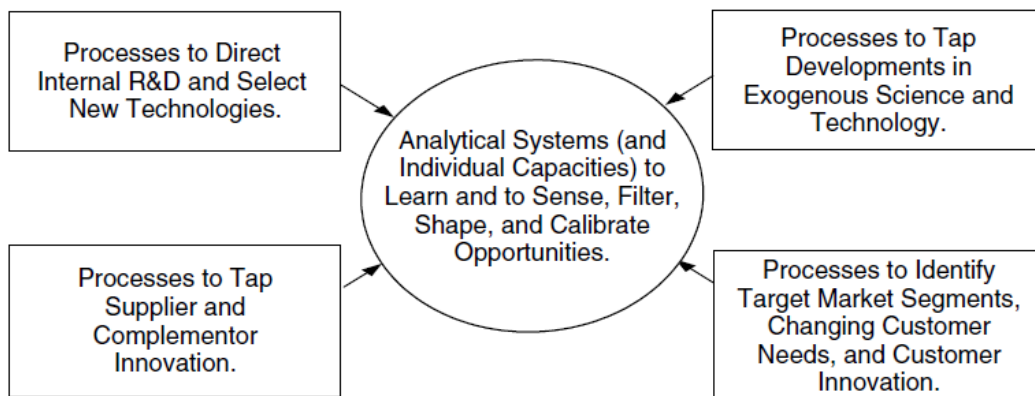
Figure 2-8: Elements for 'sensing' market and technology opportunities (Teece, 2007)

- **Seizing opportunities (figure 2-9):**

Once a new technological or market opportunity is sensed, it can be exploited through new products, processes, or services. This may require the organisation to invest in product development, innovative activities as well as commercialization activity that will introduce the new product or service to the market.
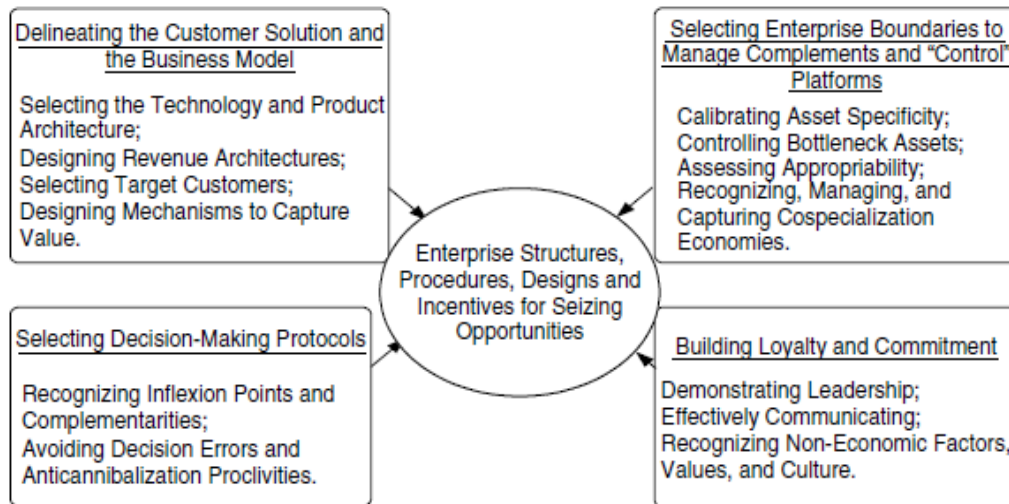
Figure 2-9: Elements for 'seizing' market and technology opportunities(Teece, 2007)

- **Managing threats and reconfiguration (figure 2-10):**

A key to sustaining profitable growth is the ability to recombine and to reconfigure assets and organisational structures as the enterprise grows, and as markets and technologies change. Reconfiguration is needed to maintain evolutionary fitness and, if necessary, to try and escape unfavourable path dependencies. In summary, continuous reconfiguration results in operational efficiency which can then result in organisational success.
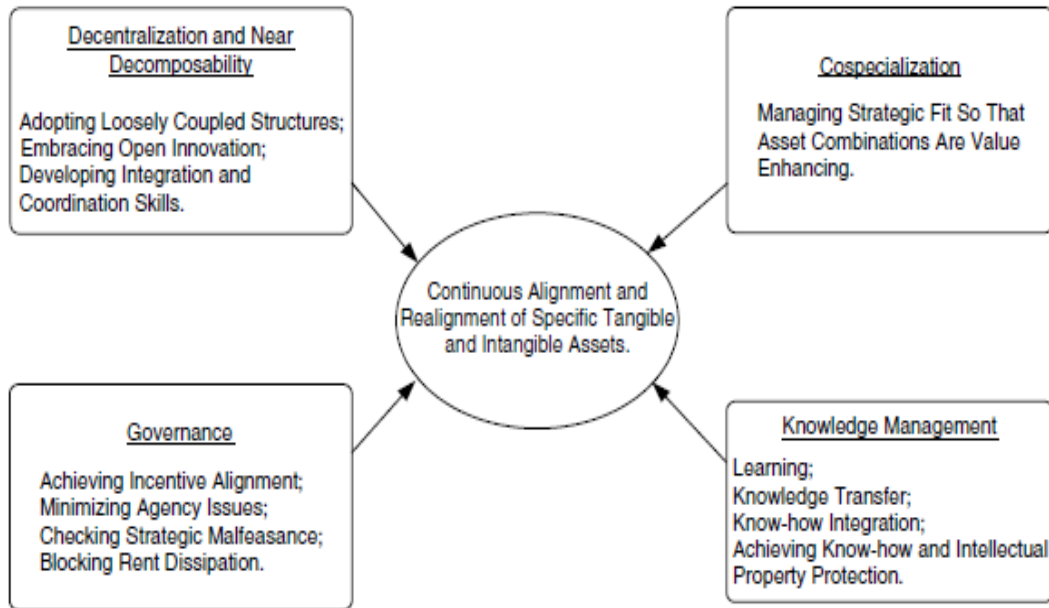
Figure 2-10: Elements of 'managing threats and reconfiguring' (Teece, 2007)

2.4.3. Responsive Organisation - Organisational Agility and Dynamic Capabilities

For organisations to thrive in an uncertain business world, they are required to quickly adapt to changes by possessing dynamic capabilities such as sensing, seizing, threat management and reconfiguration. Organisations are discovering that the best ways of doing this are by aggressively reshaping the culture of the organisation and business practices to cater for (Sarah et al., 2012):

- More collaborative and robust risk management;
- Increased use of iterative practices;
- Rigorous change management to better adapt to changing market conditions (Sarah et al., 2012)

To aggressively reshape themselves, organisations need to have the agility attributes to do so. As defined by Yusuf (1999), agility is an organisation's ability to thrive in an environment of continuous and often unanticipated changes (Yusuf et al., 1999). Therefore culture and organisational structures that provide for flexibility are needed in an environment that is continuously changing (Burba, 2015).Table 2-5 summarizes the various definitions of agility along with the essential characteristics embedded within those definitions. This summary has been adopted from Ganguly and others(2009), looking at the agility definitions and essential characteristics when defining organisational agility.

Table 2-5. Summary of the various definitions of agility, adapted from Ganguly and others (2009)

Reference	Definition	Speed / Time	Cost	Responsiveness	Flexibility	Quality	Customer needs
(Goldman, Nagel, & Preiss, 1995)	Capability of an organisation to operate profitably in an competitive environment comprised of continually changing customer habits			X	X		X
(Kumar & Motwani, 1995)	Ability to accelerate the activities on critical path and …time-based competitiveness	X		X			X
(Fliedner & Vokurka, 1997)	Ability to market successfully low-cost, high-quality products with short lead times and in varying volumes that provide enhanced value to customers through customization	X	X			X	X
(Yusuf et al., 1999)	A successful exploration of competitive bases (speed, flexibility, innovation proactivity, quality and profitability) through the integration of reconfigurable resources and knowledge management to provide customer driven products and services in a fast changing market environment	X	X	X	X	X	X
(Dove, 1999, 2001)	Ability of an organisation to respond efficiently and effectively to both proactive and reactive needs and opportunities on the face of an unpredictable and uncertain environment	X	X	X	X	X	X
(Menor, Roth, & Mason, 2001)	''The ability of a firm to excel simultaneously on operations capabilities of quality, delivery, flexibility and cost in a coordinated fashion''	X	X		X	X	
(Sambamurthy et al., 2003)	Ability of a firm to redesign their existing processes rapidly and create new processes in a timely fashion in order to be able to take advantage and thrive of the unpredictable and highly dynamic market conditions	X		X	X		X
(Raschke, David, David, & Carey, 2005)	''Ability of a firm to dynamically modify and/ or reconfigure individual business processes to accommodate required and potential needs of the firm'	X		X	X		X
(Ashrafi et al., 2005)	''An organisation's ability to sense environmental changes and respond effectively and efficiently to that change''	X		X			X

While most of these definitions of agility cover the essential characteristics of time, flexibility of the system and responsiveness, the definitions by Yusuf et al. (1999) and Dove (1999, 2001) take into account all the essential attributes of agility .

Most of the definitions in table 2-5 have speed, responsiveness and customer need as essential agility attributes. In the work done by Overby (2006), the *sensing* dynamic capability and *responsive* agility attributes are presented in a quadrant framework (fig. 2-11), exploring the different combinations of sensing and responding capabilities that organisations may possess.
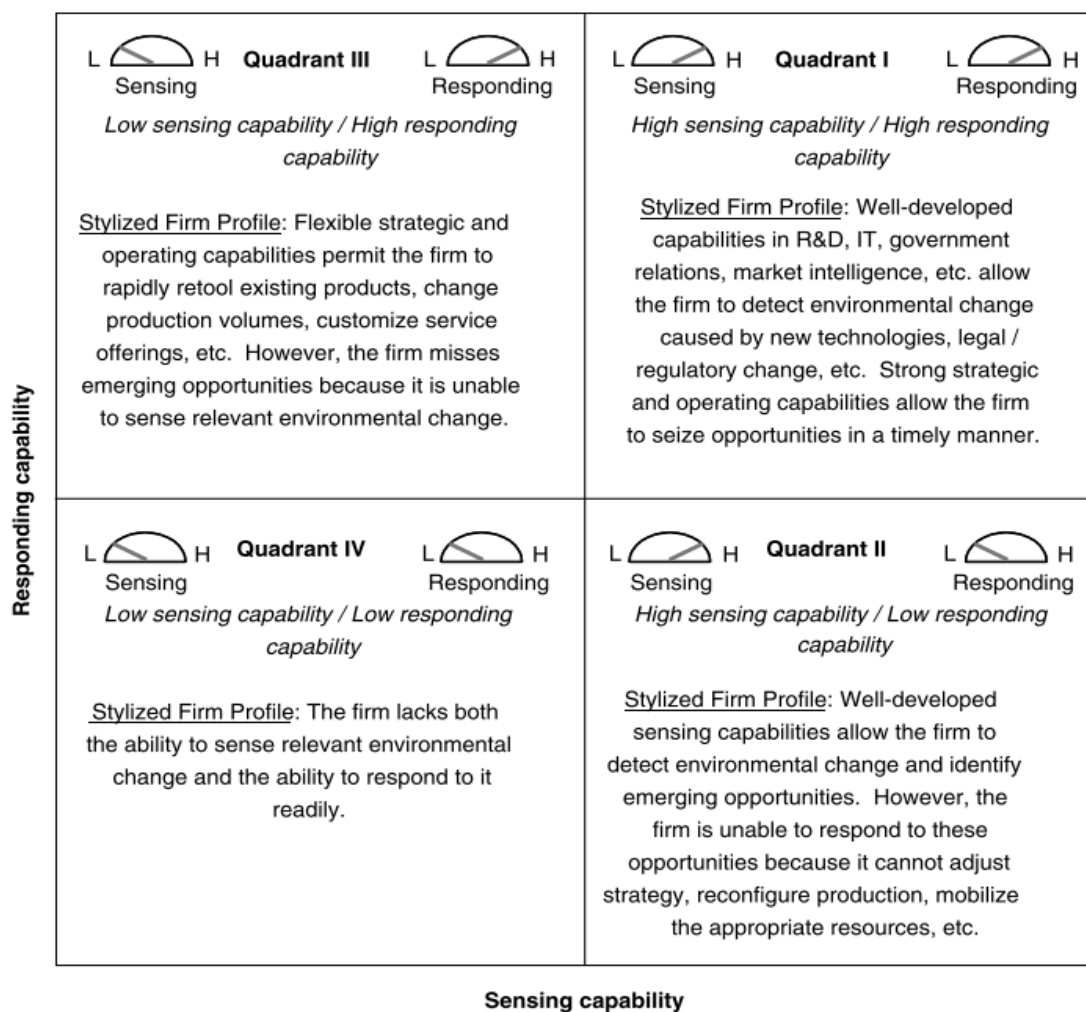
Figure 2-11: Framework of different combinations of sensing and responding capabilities (Overby et al., 2006)

Quadrant I - high sensing, high responding. Organisations in this quadrant have high sensing and high responsive capabilities. The sensing capabilities are supported by R&D, market intelligence while IT, legal, and government relations activities and the strong

responding capabilities are supported by product development, systems development, and resource utilization skills. Exponential organisations, virtual organisations and agile organisations are an example of such organisations (Overby et al., 2006).

Quadrant II - high sensing, low responding. Organisations in this quadrant might be able to sense environmental change relevant to their business, thus possessing high sensing capabilities but fail to respond to it in an agile manner (low responding). Most traditional organisations are examples of such organisations. Where unnecessary bureaucracy may slow down strategic decisions, too specialized roles may slow decision making at an operational level (Nerur et al., 2005). Over analysis - 'analysis paralyses - may slow down the strategic decision making process, causing organisations to fail to act on emerging opportunities. Risk aversion may also cause firms to pass on an opportunity even when responding to it would be beneficial. Lastly, poorly integrated processes may slow down product development and systems development activities, causing organisations to miss opportunities (Overby et al., 2006).

Quadrant III - low sensing, high responding. Organisations in this quadrant have strong responding capabilities (high responding) but are unable to sense the correct opportunities to pursue (low sensing). This is seen in many traditional organisations, where this lack of a sensing capability is due to several factors. These may include poor information flow within the organisation, data quality, and non-integrated systems. In addition to that the over-reliance on outsourced providers in areas such as IT, legal, auditing, R&D, government relations or market intelligence makes it difficult for the organisations to build the right sensing capabilities so as to respond to environmental change. In addition, poor or absent dynamic risk management capabilities may assist in their decision making processes.

Quadrant IV - low sensing, low responding. Organisations in this quadrant lack not only the ability to sense environmental change but also the ability to respond readily. The deficiencies related to sensing and responding discussed with respect to quadrants II and III apply to quadrant IV. An example of such an organisation is Kodak, which declared bankruptcy in 2012 after having invented and then rejected the digital camera. At the same time that Kodak was closing its doors, the startup Instagram (three years in business) and with just thirteen employees was bought by Facebook for $1 billion. Ironically, this happened

while Kodak still owned the patent for digital photography (Ismail, Malone, & van Geest, 2014).

With respect to the definitions of organisational agility in combination with what has been defined by Overby (2006), responsive organisations can be referred to as organisations falling within quadrant I and II possessing high response capabilities. These high response capabilities allow these organisations to seize opportunities within the environment in which they operate. Traditional organisations can be placed in quadrants III and IV with low response capabilities, which can be seen in the inability to maintain market share and to penetrate emerging markets.

The ability to respond to changes within the environment as a responsive organisation, requires an organisation to be able to sense, seize and manage threats and opportunities(Teece, 2007). This therefore means that responsive organisations need to sense, seize and manage threats and opportunities, having well-defined dynamic capabilities and agility attributes in other functions of the organisations such as risk management. This will allow an organisation to timeously sense and respond to opportunities and threats as the environment changes(Teece et al., 2016).

Risk management principles, frameworks and process are implemented in an organisation as part of the decision making processes both in managing threats and exploiting opportunities (ISO, 2009). Organisations with a highly developed culture of agility are more able to quickly respond to market conditions, be it threats or opportunities (Burba, 2015). With that said due to organisational environment change and uncertainty, organisations must identify risks sooner, adapt to change quickly in order to deliver value products, solutions and services to their market. To make the most of risk management efforts and to benefit from this practice, responsive organisations need to ensure that their risk management practice has well defined dynamic capabilities *(sense, seize, manage and transform)* that will allow the organisation to identify, analyze and measure risks as well as identify emerging opportunities (Nair et al., 2013).

2.5. Challenges of the Risk Management Process Considering Responsive Organisations

2.5.1. Risk Assessment

Risk management is fundamental to doing business especially considering the dynamic nature of the environment in which the organisation exists (Walczak, Kuchta, & Development, 2013). Effective risk management prevents the likelihood that undesirable problems may occur, or it decreases the severity of their consequences (impact), should they occur.

Key to risk management is the risk measures that are used to assess the risk exposure. Risk management has traditionally been performed by understanding the organisation's risk exposure through risk measures (impact and likelihood) and determining the negative effect (consequences) if a risk is not evaluated or monitored in terms of its risk exposure (Figure 2-11). Hussey (1978) describes the matrix as a two-dimensional aid to decision making and Cook (2008) described the matrix as a tool or technique that can be used for assigning a level of risk to the outcomes of an event. The risk matrix is designed as a 5X5 matrix with likelihood (vertical positions on matrix) and impact (horizontal positions on matrix) (Julian, 2011).

With that said certain aspects of the risk management standards have been criticised for not having an improved method for calculating risks (using impact and likelihood as a risk measure). The twin pillars of risk management defined as probability and impact look at what the odds are of an event happening as well as the damage or the benefit it would deliver if it were to happen. This measure is a two-dimensional analysis (impact and likelihood) and is derived within a risk matrix (Davis & Lukomnik, 2010). Based on the many criticisms of the risk measures, risk-management practitioners and experts have come to question the completeness of the two-dimensional measure being used, recommending the consideration of "risk velocity" thus having a three-dimensional measure to ascertain risk (Davis & Lukomnik, 2010).

Agility has become a key business driver for all organisations and is a crucial factor for an organisation's ability to survive and thrive in uncertain and turbulent markets (Dove, 2001). The term 'agile' is commonly used to describe organisations that are able to adapt to and

perform well in rapidly changing environments (Dove, 2001). In a similar way Teece and others (2016) refer to agility as the capacity of an organisation to efficiently and effectively redeploy or redirect its resources so as to create and protect its organisational value. From a risk management perspective, Davis & Lukomnik (2010) define risk velocity as how quickly an organisation responds from the initial identification of a risk to the point when it materializes. The statement that the effectiveness of risk management is dependent on both agility and resiliency can be expressed as a simple formula:

➢ Agility = Speed of response /Risk velocity

And similarly resiliency can be expressed as:

➢ Resiliency = Resource appropriately deployed / Potential Risk Impact

Therefore, risk management would be the product of both agility and capability, expressed as:

➢ Risk Management effectiveness = Agility X Resiliency (Davis & Lukomnik, 2010)

The speed at which an organisation can respond to the impact possibly introduced by a risk using available resources would therefore determine risk velocity. This would be defined as the third dimension to consider as a measure of risk hence including impact, likelihood and velocity.

Risks have positive effects (opportunity) as well as negative effects (consequences). Positive effects are opportunities within the organisation, manifesting in many forms such as operational issues (the need to cater for customer demands) as well as strategic issues (implementing initiatives that would grow the business segment, maintaining its competitive advantage). With that said, understanding an organisation's risk profile is essential because the consequences of a risk can impact the organisation's economic performance, professional reputation as well as its regulatory and legal stand point. So the rate at which a risk can manifest and the impact that it may have, can be seen as a measure that needs to be considered when measuring risk (Davis & Lukomnik, 2010). Risk management is not only about the identification of risk but risk management should ensure that the organisation has an appropriate response to risks which impact the organisation and avoids inappropriate risk actions that may result in ineffective and inefficient risk response.

2.5.2. Risk Culture

Building the risk culture of an organisation is often overlooked and regarded as creating risk awareness. This is more likely to make employees of the organisation more risk averse, which is not the appropriate risk posture for an organisation (Shinkman & Herd, 2014). How risk is managed, perceived and treated is largely a cultural aspect within an organisation What organisations should be striving for is getting each person within the organisation thinking as a risk manager, driving a culture of appropriate risk taking (Shinkman & Herd, 2014).

An organisation's risk appetite is accessed by the organisation's attitude towards risk as well as its risk tolerance levels. The organisation's risk appetite informs the level of change and innovation which an organisation is willing to take on and inherently, in an agile organisation, risk attitude may be defined as risk seeking, being comfortable with inherent variability or uncertainty and desiring an increase in risk exposure where appropriately priced. The risk tolerance of an agile organisation would therefore inherently be defined as being moderate, risk tolerance expressing the level of exposure to each risk type that the organisation is prepared to tolerate (i.e. retain), net of risk management processes, procedures and strategies.

Perception of risk (good or bad) determines how much risk (positive risk - opportunity) an organisation is willing to take. In addition to that the culture of the organisation may also set the tone for the level of risk that is willing to undertaken.

2.5.3. Dynamic Capabilities in Risk Management

The risk fraternity's ability to continuously evolve and transform itself is one of its most critical capabilities in today's business environment. Risk management will need to change and adapt to the future to consistently provide the benefits outlined in the framework that has been adopted by the organisation. With the right focus by both the organisation and the risk fraternity, the benefits derived from risk management will support business performance and provide organisations with confidence in their ability to handle the uncertainties of the future. Several studies have noted that the ability to innovate and transform is vital for the ecosystem

in which we operate. This is even true of the risk community that exists within organisations that are now operating under dynamic, and rapid changing environmental and business conditions. *Firstly*, risk management has been defined as an integral part of the organisational process, contributing to the demonstrable achievement of objectives as well as the improvement of the organisation's operations and process. In addition to that, risk management is also seen as a key part of decision making, helping decision makers to make informed decisions. *Secondly*, risk management principles should set out to describe what risk management activities should be and what they should achieve distinguishing between the characteristics of risk management and what it should be delivering. The risk management principles as defined (ISO, 2009) stipulate the need to be dynamic, iterative and responsive yet in the same breath define the risk management processes as being planned, systematic and methodical. This may imply that the principles of diversity, iteration and change are overshadowed by aspects that are defined as systematic, structured and timely. With these principles in mind, the risk management community may need to develop risk management principles that guide the process of risk management in the different kinds of organisations in which risk may exist. *Thirdly,* in today's economic landscape, organisations (virtual, traditional, agile, and digital) will continue to face volatility, complexity, and ambiguity. Risk management therefore has an important role to play regarding how an organisation manages and prospers through these times of uncertainty and in dynamic environments. Regardless of the type and size of the organisation, they are still impacted by change so the strategy adopted needs to be true to what the organisation wants to achieve. Risk management should therefore be aligned to the organisational strategy staying true to the organisation's mission.

Fourthly, risk management practices are planned, systematic and methodical. This poses the challenge of being able to timeously identify, respond and mitigate risks such that organisations operating in dynamic, rapidly changing and non-linear environments may reap the benefits of risk management. In dynamic environments risk management practices may be required to be dynamic, radical and innovative, proportionate to the level of risk management within the organisation. This may result in a disruption within the risk fraternity where the dynamic capabilities *(sensing, seizing, manage and transform)* of the risk practices are considered together with the agility attributes of the organisation. Considering the dynamic capabilities framework (DCF) risk management needs to:

- *Sense.* This involves building dynamic capabilities with risk management and being able to sense capabilities that are focused on new, improved developments or even radical facelifts of risk practices. These need to be embraced, as opposed to forcing an implementation of risk frameworks onto responsive organisations.

- *Seize.* This involves being able to structure and design so as to seize opportunities through the possession of the means by which to address opportunities. It involves maintaining and improving the risk competency within a specific context then investing in technology and skills that will achieve industry or organisational acceptance.

- *Managing threats / transformation.* This involves implementing risk management principles that inform continuous alignment (and realignment) with organisational operations and processes, and embedding this behaviour in risk management practices.

Dynamic capabilities advocate that, in organisations of deep uncertainty such rapid economic changes, management must lead the organisation in sensing, seizing, and transforming the organisation, marrying the right risk management capabilities and tools with the organisation's strategy and agility (Walczak et al., 2013). The dynamic capabilities framework can therefore help guide managers with respect to when and how to manage risks when operating in conditions of uncertainty. The framework can help in assembling the elements needed to decide when to invest in risk management tools that will allow for dynamic risk management, catering for the level of agility within the organisation (Walczak et al., 2013).

2.5.4. Gap in Current Research:

Risk management as a key tool in decision making should be aligned to the organisation with specific focus on the organisation's processes, so as to assist in the active and effective management of risk across the business (ISO, 2009).

The Committee of Sponsoring Organisations of the Treadway Commission (COSO) and the ISO31000 are well known risk frameworks that have been developed for the management of risks. COSO has gained much recognition and influence because of its link to the Sarbanes-Oxley requirements for companies listed in the United States (Moody, 2011) and was updated in 2017 to the Enterprise Risk Management - Integrated Framework - COSO. These changes are said to address the need for organisations to improve their approach to managing risk so

as to meet the demands of an evolving business environment and it highlights the importance of considering risk in both the strategy-setting process and in driving performance. The framework is a set of principles organised into five components: governance and culture; strategy and objective-setting; performance; review and revision; and information, communication, and reporting. What is delivered through the adherence to these principles is the ability to provide management and the board with a reasonable expectation that the organisation understands and strives to manage the risks associated with its strategy and business objectives. What cannot be attained from using the COSO framework is the ability to assess the organisation dynamic risk management capabilities and attributes so as to ensure that the risk function and processes are continuously transforming and reconstructed to address the needs of a changing environment.

ISO3100 is currently regarded as best practice for risk management frameworks and incorporates best practice from COSO (Fraser & Simkins, 2010). ISO3100 provides a generic guideline and it is not intended to impose uniformity of risk (Fraser & Simkins, 2010). The design and implementation of risk management is therefore dependent on the varying needs of a specific organisation, its particular objectives, context, structure, products, services, projects, the operational processes and specific practices employed (International Standards Organisation, 2018; ISO, 2009). ISO 31000 includes a detailed list of the suggested principles for risk management and has an open system model to fit multiple needs and context, therefore ISO 31000 can be used as a reference when developing a dynamic risk management framework. ISO 31000 as a best practice for risk management frameworks does not assess the dynamic capabilities and the agility attributes required for dynamic risk management.

Despite the fact that risk management is of crucial importance for software project success, very few models have been found that explicitly integrate risk management with agile development processes. Nyfjord & Kajko-Mattsson (2008) developed an integrated model that would integrate agile and risk management, as these areas represent different types of processes. Based on the findings of the research done by Nyfjord & Kajko-Mattsson (2008) the integrated model can be used as a reference model by all organisations that have adopted an agile software development approach, in comparing their development approach with their risk management practice. The integrated model has been found by Nyfjord & Kajko-Mattsson (2008) to have limited utility as it did not provide guidelines on how to actually

conduct agile risk management. As a result, Nyfjord & Kajko-Mattsson (2008) suggested that the integrated model should be extended with guidelines on how to conduct agile risk management. Based on the research results, Nyfjord & Kajko-Mattsson draw three main conclusions: (1) it is a valid solution for addressing the current lack of risk management in agile development, however only in certain projects and organisations, (2) the model needs to be further elaborated in terms of the guidance it provides, and (3) it needs be further investigated in terms of its applicability in practice.

This research therefore has the objective to develop a framework with the elements that will guide an organisation to apply more dynamic risk management principles in a dynamic environment.

2.6. Conclusion

Risk management is an important decision making process within a business and has become an increasingly important business driver for strategic decisions. A successful risk management programme should be proportionate to the level of risk in the organisation in relation to the size, nature and complexity of the organisation. Organisations operating in today's dynamic and rapidly changing environment are designed to sense and anticipate business changes and reconfigure themselves for changes within the environment in which they operate. So organisations should align their risk management practices to the organisational structure, being responsive to changing circumstances and embedding them into routine activities. This approach will enable a risk management initiative to deliver outputs of increased organisational performance (Soltanizadeh et al., 2016) including compliance with applicable governance requirements, assurance to stakeholders regarding the management of risk and improved decision making. The outputs from successful risk management include compliance, assurance and enhanced decision making. Traditional risk management practices are planned, systematic and methodical, thus posing the challenge of being able to timeously identify, assess, evaluate, monitor and report risks. In dynamic environments risk management practices may be required to be dynamic, radical and innovative, proportionate to the level of risk management within the organisation. Dynamic capabilities (sensing, seizing, managing and transforming) can therefore assist in managing risks when operating in conditions of uncertainty.

Chapter 3: Research Methodology

3.1. Introduction

The purpose of this chapter is to provide the background to the philosophical stances of the research and present an overview of the research approach, the research strategy chosen, the main research question, the data collection and the analysis process for this research. The chapter concludes with an overview of how this research study was conducted and how the research design was applied with reference to both the online pilot and the survey. The last section of this chapter covers the ethics and anonymity of the study.

A chapter overview is depicted in Figure 3-1, providing an outline of chapter 3.

Part 2: Theoretical Overview

Chapter 3: Research Methodology

Section 3.1.
Introduction

Section 3.2.
Philosophical Perspective

Section 3.3.
Research Approach

Section 3.4.
Research Strategy

Section 3.5.1.: Research design

Section 3.5.
Research design and methodology applied in the study

Section 3.5.2. : Research objective and main question

Section 3.5.3.:Research paradigm

Section 3.5.4.:Research Strategy

Section 3.5.5. Data Collection and research partcipnats

Section 3.6.
Ethics and anonymity

Section 3.7.
Conclusion

Figure 3-1: Overview of chapter 3

3.2. Philosophical Perspective

Understanding and choosing a philosophy is an important step in planning and carrying out research. Choices of ontology, epistemology and axiology still influence the practice of research and need to be considered as this is the philosophical fabric on which the research is based (Saunders et al., 2012). Table 3-1 provides a summary of the ontological, epistemological and axiological worldview as well as methodological information and data collection in a post positivist, interpretivist, transformative and pragmatic context.

- Ontological assumptions are concerned with the nature of reality. They relate to our perception of reality and how this influences our behaviour as people (Phillimore & Goodson, 2004);
- Epistemology is the theory of knowledge and addresses facts by asking what the acceptable knowledge is; asking questions regarding what the justified true belief is. This philosophy is most commonly used in scientific research as it searches for facts and information that can be proved without doubt rather than changeable situations and opinions (Norris, 2005); and
- Axiology allows researchers to understand and recognise the role their values and opinion play in research as opposed to eliminating or trying to balance its influence.

Further to these assumptions, Creswell et al (2011) add methodological and data collection assumptions. Table 3.1 below summarises these assumptions.

Table 3-1: Research paradigms and philosophical assumptions (Creswell et al., 2011)

		Philosophical Assumption				
		Ontology	Epistemology	Axiology	Methodology	Data collection tool
Research Paradigm	Positivist/ Postpositivist	Singular reality Rejects or fail to reject hypotheses	Distant Impartial Objective	Unbiased Objective	Deductive Test prior theory	Experiments Quasi-experiments Test Scales
	Interpretivist/ Constructivist	Multiple realities Illustrate different perspectives	Close Subjective Observer	Biased Contextual understanding	Inductive Build up to pattern, theories and interpretations	Interviews Observations Document reviews Visual data analysis
	Transformative	Multifaceted Recognises power	Collaborative Political Suspicious Builds trust Honour participant view point	Based on human rights and social justice Contextual understanding Advocacy	Participatory Cyclical reviews of results	Diverse range of tools
	Pragmatic	Singular reality Multiple reality Test hypotheses	Practical	Biased Unbiased	Combining (qualitative and quantitative) Mix Methods	Tools from positivist and interpretivist

In consideration of Table 3-1, paradigm represents a set of shared assumptions or ways of thinking about some aspects of the world (Oates, 2007). It also informs the thought process behind how the research is to be conducted as well as how the knowledge is to be gained or created. Research, whether qualitative or quantitative, is based on assumptions about what constitutes valid research as well as the appropriate research methods to be applied. It is important to know what these research assumptions are in order to conduct research. Creswell (2007, 2009) categorised the research paradigms based on the underlying research ontology and epistemology, that is assumptions about knowledge and how it can be obtained. These are the categories of research paradigms namely :(1) positivist, (2) interpretive and (3) transformative and (4) pragmatic (Table 3-1)

- Post-positivist (and positivist) paradigm. Positivism is sometimes referred to as scientific method or science research and reflects a deterministic philosophy where causes

probably determine effects or outcomes (Creswell et al., 2011). Post-positivists work from the assumption that any piece of research is influenced by a number of well-developed theories (Cook & Campbell, 1979). Positivists and postpositivist research is most commonly aligned with quantitative methods of data collection and analysis(Mackenzie & Knipe, 2006).

- Interpretivist/constructivist paradigm. The interpretivist/constructivist researcher tends to rely upon the research participants' views of the study and recognises the impact their own background and experiences will have on the study (Creswell et al., 2011). Constructivists do not generally begin with a theory as do postpositivists. The researcher starts with the participant's view and builds "up" to patterns, theories, and interpretations (Creswell et al., 2011). Quantitative data may be utilised in a way which supports or expands upon qualitative data.

- Transformative paradigm. Transformative researchers are multi-faceted, and their views are based on different social and cultural positions. The researcher actively involves participants and is collaborative. They build trust and honour participants' standpoints (Creswell et al., 2011).Transformative researchers may utilise qualitative and quantitative data collection and analysis methods in the same way as the interpretivist/constructive researcher. A mixed methods approach provides the transformative researcher structure for the development of portraits of the social world through the use of multiple perspectives and lenses.

- Pragmatic Paradigm. Pragmatism is not committed to any one system of philosophy or reality (Creswell et al., 2011). Pragmatist researchers test hypotheses and provide multiple perspectives. The researcher collects data by "what works" to address research questions focused on the 'what' and 'how' of the research problem. Mixed-methods researchers align themselves with the pragmatic (Creswell et al., 2011). It may be said, however, that mixed methods could be used with any paradigm.

The research paradigm adopted contains important assumptions about the way in which the researcher will understand, conduct and investigate because it is the choice of paradigm that sets down the intent, motivation and expectations for the research (Mackenzie & Knipe, 2006). That means that the philosophies adopted influence the practical considerations for the research being conducted as they provide guidance and structure. Selecting a paradigm as a first step within research is important because, should this not be done, there will be no basis

for the choices that may follow regarding methodology, methods, and the design of the research (Mackenzie & Knipe, 2006). The research paradigm and research question, determine which research data collection and analysis methods (qualitative/quantitative or mixed) will be most appropriate for a study. In this way researchers apply the data collection and analysis methods most appropriate for a particular research study. It is also possible for any and all paradigms to employ mixed methods rather than being restricted to any one method, however this may potentially diminish and unnecessarily limit the depth and richness of a research project (Mackenzie & Knipe, 2006).

3.3. Research Approach

Research can be defined as research designs that are plans for a research study, and they may include philosophical assumptions, strategies and research methods (Creswell, 2009). The type of research strategy adopted is not just informed by how the study will be conducted but also by the inquiry that will be undertaken in the study, the methods to be applied and the approach to be followed (Creswell, 2009). The various approaches of inquiry and methods are presented in table 3-2 for qualitative, quantitative and mixed methods.

- Qualitative is a means of exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves: emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretation of the meaning of collected data (Creswell, 2009).
- Quantitative is a means of testing objective theories by examining the relationship among variables. These variables can be measured, typically on instruments, so that numbered data can be analysed using statistical procedures (Creswell, 2009).
- Mixed Methods; with the development and perceptive legitimacy of both qualitative and quantitative research in the social and human science (Morgan, 2007). Mixed methods, employing the combination of qualitative and quantitative and has gained in popularity. The concept of mixing different methods originated in 1959 when Campbell and Fiske used multimethod to study validity of psychological traits (Johnson & Gray, 2018). They then encouraged others to employ their multimethod

matrix to examine multiple approaches to data collection (Bryman, 2011; Creswell, Shope, Clark, & Green, 2006; Johnson, Onwuegbuzie, & Turner, 2007; Tashakkori & Creswell, 2007). This prompted the mix of field methods, such as observation and interview (qualitative) with traditional surveys (quantitative), recognising that all methods have limitations. In the Sage Handbook of Mixed Methods in Social & Behavioural research (2018), it is stated that mixed methods is pluralistic; accepts multiple kinds of knowledge; views both order and change as an important part of reality and accepts that some domains are more lawful than others. Triangulation data source as a means of seeking convergence across qualitative and quantitative methods was born (Bryman, 2011). Triangulation is the use of more than one approach to investigate a research question in order to enhance confidence in the findings derived.

Table 3-2 Qualitative, quantitative and mixed methods strategy of inquiry and methods, adopted from (Creswell, 2009)

	Quantitative	Qualitative	Mixed Methods
Strategy of inquiry	• Experimental design • Non experimental design such as surveys	• Narrative research • Phenomenology • Ethnographies • Ground theory studies • Case Study	• Sequential • Concurrent • Transformative
Methods	• Pre-determined • Instrument based questions • Performance data, attitude data, observational data and census data • Statistical analysis • Statistical interpretation • Survey	• Emerging methods • Open-ended questions • Interview data, observation data, documentation data and audio-visual data • Text and image analysis • Themes , pattern interpretation • Focused groups	• Both pre-determined and emerging methods • Both open and closed ended questions • Multiple forms of data drawing on all possibilities • Statistical and text analysis • Across databases interpretation

The need for clarity of the research paradigm, strategy of inquiry and methods of research raises important questions regarding the design of a research project; whether it is quantitative, qualitative or mixed methods (Creswell, 2009), as depicted in table 3-2.

In summary:

- Quantitative is adopted mainly by a post positivist/positivist, following an experimental strategy of inquiry and a pre-and post-test measure of attitudes. The research tests a theory by specifying the hypothesis and collects data on an instrument that measures attitudes and the information is analysed through statistical procedures and hypothesis testing.

- Qualitative is adopted based on a constructivist/interpretivist worldview, following an ethnographic design, open interviewing and observation of behaviour. The researcher establishes meaning from the views of the participants. This would mean that in qualitative studies, the research may identify a group and study or observe behaviour through patterns over time. Data is collected through observation, and engagement.

- Mixed methods research is adopted based on a pragmatic worldview, using both qualitative and quantitative means of collection. The research assembles diverse types of data that will enable a researcher to best understand the research problem.

3.4. Research Strategy

For the three research approaches (quantitative, qualitative and mixed), there are different research strategies that can be used for data collection. The survey as a research strategy is mostly associated with the philosophical paradigm of positivism, since it seeks patterns and generalisation. Surveys can be used in various ways but generally refers to the selection of a large sample of participants from a pre-determined population which would be a population of interest (Kelley, Clark, Brown, & Sitzia, 2003). Using survey as a research strategy allows for a wide and inclusive coverage of research participants, resulting in a research study that is more representative of a wider population.
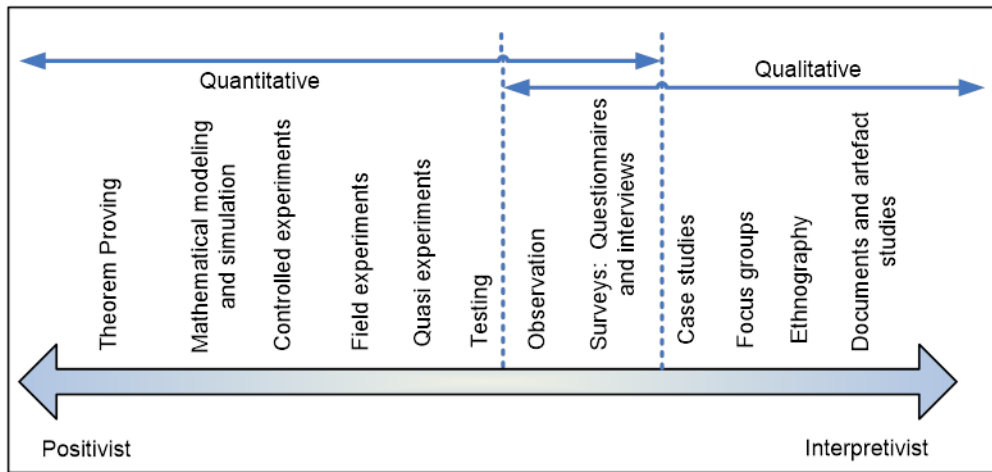
Figure 3-2: Research Methods / Strategies (De Villiers, 2005)

As depicted in figure 3-2, surveys can be done by conducting interviews or through the development of a questionnaire. Interviews can be done either face-to-face or telephonically and questionnaires can be paper or web based. Observations and experiments can be conducted to collect either quantitative, qualitative or a mixture of the two methods. Figure 3-2 shows a view of research methods situated on a Positivist and Interpretivist axis, providing attention to the qualitative and quantitative methods as well as the overlap that exists with methods such as surveys (questionnaire and interview) (De Villiers, 2005).

3.5. Research Design and Methodology Applied in this Study

This section provides detail on the research design and methodology applied in this study providing: an overview of the research objectives and main research question, the research design, research strategy as well as the data collection and analysis process for this research.

For the purposes of this study and the research questions defined, this section aims to provide an overview of the research design application.

3.5.1. Research Design

This section of the chapter describes how the research was conducted in order to address the problem statement. The researcher of this study considered how the research would be conducted through a five-phase process as depicted in figure 3-3.

The purpose of this study is to develop a dynamic risk management framework and principles to guide organisations as to how risk management can be conducted in a dynamic risk environment. This was done by first conducting an online questionnaire in a large population with both open-ended and closed questions. The results of the online questionnaire together with the literature were then used to develop the initial risk framework. This framework was then evaluated through an interview process with a selected group of individuals resulting in an enriched final version of the framework.
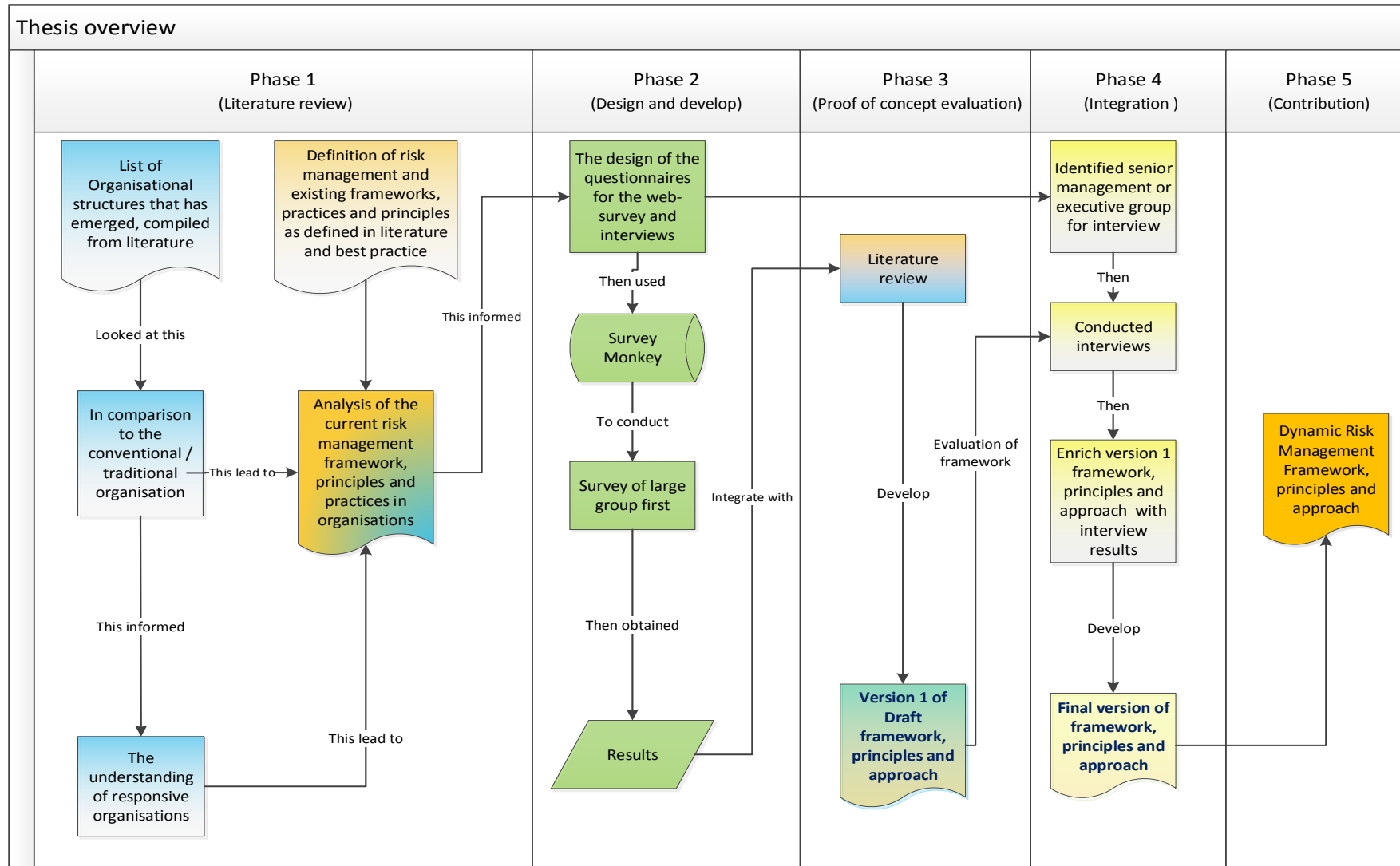
Figure 3-3: Research phases in the study

- Phase 1. Literature review. Existing literature on risk management, existing risk frameworks, organisations such as agile, virtual, exponential and conventional as well as the challenges of risk management are looked at. In this chapter the concept of organisational agility is also introduced.

- Phase 2. Design and develop. An online questionnaire was developed and uploaded on a data collection tool. The online questionnaire was sent out to the identified population. Data collection is further discussed in section 4.2. These were based on the literature review that had been done in phase 1 of the study.

- Phase 3. Proof of concept evaluation. During this phase results collected during phase 2 (design and develop) were used to develop the initial dynamic risk management framework.

- Phase 4. Integration. In this phase the initial framework is evaluated with selected executive and senior management members. This was done by conducting semi-structured interviews as well as presenting the framework for input. A presentation of the initial dynamic risk management framework and principles was used in the semi-structured interviews.

- Phase 5. Contribution. The final version of the dynamic risk management framework, principles and practices are presented.

3.5.2. Research Objective and Main Question

This research aims to develop a dynamic risk management framework that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment.

Table 3-3 Main and sub-research questions

Main Question (MQ)	What are the elements of a framework that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment?	
Sub-research questions (SQ)	SQ1	What constitutes a traditional risk management framework?
	SQ2	What are the guiding principles that organisations use in risk decisions?
	SQ3	What constitutes risk management in dynamic environments?

3.5.3. Research Paradigm

The research paradigm chosen for this study is that of interpretivism because interpretive studies involve understanding the phenomenon subjectively (Orlikowski & Baroudi, 1991). Interpretive papers provide evidence of a nondeterministic perspective, with the intent to increase understanding of the phenomena within a specific cultural and contextual setting, and an examination of the phenomena and the setting from the perspective of participants (Walsham, 1995, p. 384). Interpretive studies do not prove or disprove a hypothesis, as in positivist research. Instead it tries to identify, explore and explain how the factors in a social setting are related or independent. It considers how the research participants perceive their world (individually or in a group) and then gains an understanding of the phenomena through the meaning and values that the people assign to them. Choosing an interpretivist paradigm for this study means that the research will be able to revolve around the study from different contexts based on the research participants' involvement; taking into account the different perspectives of professionals in different organisational structures. It creates a rich understanding of dynamic risk management in a dynamic environment, and looks at how the risk fraternity and individuals engaging with risk make sense of this. It filters the participants' statements and responses through the lens of the researcher's own subjectivity, and then produces a view with reasoning for it (Johari, 2009). This would mean that by being an interpretive study the researcher was able to look at how the research participants perceive their risk management world (individually or in a group) and then gain an understanding of their experience and facts through the meaning and values that the participants assign to them. In addition to that, in choosing an interpretivist paradigm for this study it allowed the researcher to analyse the study from different contexts based on the research participants' involvement; taking into account the different perspectives.

Klein & Myers (1999) propose seven principles for interpretive field research, depicted in table 3-4. Principle 1 suggests that all human understanding is achieved by moving between and considering the interdependent meaning of parts and the whole that they form. Principle 2 requires a critical consideration of the social and historical background of the research setting. Principle 3 refers to the interaction between researchers and subjects. Principle 4 looks at abstraction and generalisation. Principle 5 requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings. Principle 6 deals with possible multiple interpretations among participants and

principle 7 refer to sensitivity to possible biases in the narratives collected from the participants.

Table 3-4 Summary of principles for interpretive field study (Klein & Myers, 1999)

No.	Summary of principles for interpretive field research
1	**The fundamental principle of the hermeneutic circle.** This principle is fundamental to all the other principles and suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form.
2	**The principle of contextualisation.** This requires critical reflection of the social and historical background of the research setting so that the intended audience can see how the current situation under investigation emerged.
3	**The principle of interaction between the researchers and subjects.** This requires critical reflection on how the research materials were socially constructed through the interaction between the researcher and participants.
4	**The principle of abstraction and generalisation.** This requires relating the idiographic details revealed by the data interpretation through the application of principles 1 and 2 to theoretical, general concepts that describe the nature of human understanding and social action.
5	**The principle of dialogical reasoning.** This requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings with subsequent cycles of revision.
6	**The principle of multiple interpretations.** This requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study.
7	**The principle of suspicion.** This requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants.

3.5.4. Research strategy

The research strategy chosen for this study is that of the survey since it can be used in both quantitative and qualitative research. Survey as a research strategy allows the research to obtain the same kind of data from a large group of people, in a standardized manner (Oates, 2008). The assumption behind using a survey is that it will employ a questionnaire as a means of data collection but interviews may also be used. The data collection that can be used for surveys is that of both interview and questionnaire (De Villiers, 2005), facilitating the collection of large amounts of data over a short period of time.

Interpretivism for this study provides an excellent guideline as to how the survey and interviews is to be conducted or more importantly how the study needs to be interpreted. Survey research was chosen as the most suitable research approach for this particular study carried out through an online questionnaire and interviews.

The high-level design of the questionnaire shows the various sections of the questionnaire as well as the number of questions in each section. A more detailed view of the questionnaire in terms of the questions and the question type has been provided within APPENDIX A: A-2

3.5.5. Online Questionnaire - Design and Process

The online questionnaire developed consisted of seven sections as depicted table 3-5; namely, introduction and consent, participant function and organisational demographics, risk management framework, risk management principles, risk management process, traditional vs. dynamic risk management and end of survey.

Table 3-5 High level view of the online questionnaire with sections

FRAMEWORK FOR DYNAMIC RISK MANAGEMENT IN A DYNAMIC ENVIRONMENT	
Section 1	Introduction and consent
Section 2	Participants' function and organisation demographics
Section 3	Risk management frameworks
Section 4	Risk management principles
Section 5	Risk management process
Section 6	Traditional vs. Dynamic risk management
Section 7	End of survey

The questionnaire was designed so as to collect both quantitative and qualitative feedback from the research participants. The questionnaire required participants to select responses from 15 questions that were designed to be either 'yes' or 'no', free text, drop down list, multiple choice, checkboxes and a 5 point rating scales.

- *Section 1* is an introduction of the study to the potential research participant as well as consent from the participant to participate in the study on a voluntary basis. In this

section there is one question (question 1), formulated such that there is a 'yes' or a 'no' answer in terms of providing consent. Based on the fact that the primary aim of this question is to provide information on the study as well as obtain consent, skip logic has been built into the questionnaire so as to ensure that when a participant selects the answer 'yes' the participant is directed to the next section of the questionnaire. If the research participant selects 'no' skip logic has been built in so that the participant is directed to the end of the questionnaire.

- *Section 2* asks for information about the research participant's job function and level as well as the type of organisational structure in which the participant works. This section consists of question 2-5, formulated so that the information received in this section may be used to analyse the number of participants that participated in the various job roles, levels and organisational structures. Both qualitative and quantitative data is collected in this section.

- *Section 3* is the risk framework section and seeks to obtain an understanding of what risk frameworks the participants know or are familiar with as well as the risk management framework design elements considered by the participant's organisation. This section consists of question 6 and 7 which are checkbox and rating-scale type questions.

- *Section 4* looks at the risk management principles adopted by the various organisational structures and seeks to obtain an understanding from the research participants of the values they would say need to be adopted in a changing environment. This section consists only of question 8, which is a two-part question that comprises a 5 point rating-scale as well as free text component.

- *Section 5* asks about the risk management process used in the organisations in which the participants work. In addition to that a question is posed on the challenges currently faced when conducting risk assessments. This section consists of question 9 and 10, with free text and 5 point rating-scale type questions.

- *Section 6* looks at dynamic risk management in terms of principles, process and framework. This section consists of 4 questions (question 11-14), which are free text, rating-scale and check-box type questions.

- *Section 7* is the end of the survey. In this section the research participant is thanked for their participation and further asked to provide me with potential participants by providing me with emails. Question 15 which requests additional participants was

built into the questionnaire because of the fact that the research sampling technique used for the survey is that of snowballing. This question has been designed so that it is optional.

To ensure reliability of the questionnaire, the online questionnaire was designed using Survey Monkey; capturing and loading the questionnaire sections and questions is stated in table 3-5 and within APPENDIX A: A-2. To ensure quality, the Survey Monkey (www.surveymonkey.com) generous capability was used as guide. This is a system functionality that allows you to see the quality of your survey. For this research the quality had been rated by the tool as 'great' with an estimated 10 minutes completion timeline. In addition to that Survey Monkey (www.surveymonkey.com) was the preferred choice due to the fact that it has a variety of question types i.e. dropdown, multiple choice, rating scale and free text that could be used within the questionnaire. It also allows for page skip logic and one has the facility to make some questions compulsory.

Being an interpretive study through the use of an online questionnaire the researcher was able to obtain large amounts of data on the research participant's view of traditional risk management frameworks, principles and processes as well as data relating to the dynamic risk management framework and principles.

3.5.5.1. Online Questionnaire Pilot

The success or failure of the online questionnaire has consequences for the successful completion of the study which could impact on the successful development of the dynamic risk management framework. Prior to conducting the online questionnaire, a pilot was conducted so as to ensure that the online questionnaire was easy to use and understand. The following review elements were considering during the pilot; namely,

- Time to complete;
- The use of plain language;
- Questions are simple and to the point; and
- Survey look and feel.

In addition to these review elements participants were asked to provide general comments that might assist me in designing the survey.

3.5.5.1.1. Participants

Seven individuals were selected to form part of the pilot, depicted in table 3-6. These individuals were selected based on their job function, expertise in research design and level of expertise.

Table 3-6: Pilot participants and criteria

Selection Criteria	Pilot Participants
Job function	• 4 risk practitioners • 2 professors / researchers • 1 Quantitative analyst
Level of expertise	• 1 risk executive • 1 risk senior manager • 1 risk middle manager • 1 risk junior staff • 2 academic researchers • 1 senior analyst
Expertise in research design and analytics	• 2 researchers / professors • 1 quantitative analyst

The pilot participants selected covered all the review elements; namely, time to complete, use of plain language, validation of whether the questions are simple and to the point, as well as the questionnaire look and feel. In addition to that the pilot phase allowed the researcher to gain more insight into the Survey Monkey tool (www.surveymonkey.com) and it provided the researcher with an opportunity to improve on the questionnaire quality by considering the general comments provided.

3.5.5.1.2. Data Collection for Questionnaire

The online questionnaire pilot was sent to the pilot participants by email. The email sent provided for an overview of the purpose of the pilot as well as a table that included the review feedback elements to consider when completing the survey. Included in the email was the introductory mail that would be sent to the research participants introducing the

researcher as well as providing a high-level overview of the research. A survey link was generated through Survey Monkey (www.surveymonkey.com) and this was also included in the mail so as to allow the pilot participants to gain access to the questionnaire. Providing the link allowed the researcher also to test what the participants would be experiencing when using the link.

3.5.5.1.3. Participant Feedback for Pilot

Of the seven pilot participants, six participants confirmed that they had successfully completed the questionnaire. Feedback was received from the pilot participants (APPENDIX A.3) which was then used to improve on the online questionnaire. Feedback was received regarding the review elements and much of the feedback received was positive.

The feedback received from the six pilot participants is summarised as follows with reference to the review elements.

Table 3-7: Questionnaire pilot - participant feedback

Review Elements	Summary of participants feedback
Time to complete	- Three of the participants completed the survey in 10 minutes - Two completed in 13 minutes and one completed in 11 minutes - The comments provided were that the survey was easy to read and understand.
The use of plain language	"Good" "Easy to understand" "The language was easy to understand" "Aligned to business language"
Questions are simple and to the points	- Four of the participants noted that the survey questions were simple and to the point - The header in the questionnaire provides guidance and provides context for the questions - Questions are formulated in an easily understandable way. - Q8 was said to have been too long and required improvement
Survey look and feel	The pilot participants were happy with the look and feel of the questionnaire

General Comments	- Questions 6 – "to be improved by providing guidance to the participants in terms of defining the different types of organisations" - Question 8 - "to be articulated in a better way" - Question 9 – "management to the word risk" - Question 15 – "email address or cell phone number to be requested for additional research participants"

The feedback was positive and useful in terms of improving the questionnaire design. The email version of the feedback received has been included in APPENDIX A: A-3.

3.5.6. Data Collection and Analysis

Primary and secondary data sources were used to collect data. Primary data is data that has been collected for the specific research problem at hand, using procedures that fit the research problem best. Through the collection of primary data new data and insight was obtained every time the survey was completed by a participant (Hox & Boeije, 2005). Secondary data is data that have been obtained collected, achieved and made available through various channels such as online journals (Hox & Boeije, 2005). This provided knowledge of existing structures and systems.

- *Literature Review (secondary data)*. The purpose of the literature review was to gain an understanding of the various responsive organisational structures and their functioning; namely, agile, virtual, exponential as well as traditional organisations. The literature review was extended to include existing risk management principles, frameworks and practices as well as the theory of dynamic capabilities.
- *Online questionnaire (primary data)*. The main objective of the online questionnaire was to obtain a professional perspective and facts about the existing risk management principles, framework and practices in the participants' (both risk practitioners and business) contexts as well the participants' perspectives of what would constitute dynamic risk management.
- *Semi-structured interviews (primary data)*. The main objective of the interview was to establish the professional and expert view of dynamic risk management. This data were then used to evaluate the dynamic risk management framework developed.

The data method in each research design phase is stated and is linked to the relevant sub-research question.

- The literature review phase primarily addresses the sub-research questions 1-3. The literature review is reflected in chapter 2 of this research. Looking at:

  - Organisational agility (including dynamic capabilities);
  - Conventional / Traditional organisations;
  - Agile organisations (AOs);
  - Virtual organisations (VOs);
  - Exponential Organisations (ExOs); and
  - Risk Management.

- The design and development phase addresses all the sub-research questions 1-3 during the data collection process. Data is collected by means of an online questionnaire. In the online questionnaire qualitative data is collected through the use of open-ended questions and quantitative data has been obtained from the questions with a rating scale. The survey results are analysed in chapter 4 and in chapter 5 an integration of findings is done. The initial framework is presented.

- The proof of concept evaluation phase is where the initial framework is presented in chapter 6 and evaluated by conducting semi-structure interviews. The final version of the dynamic risk management framework is developed.

- Contribution; no data is collected in this phase. The final dynamic risk management is presented in chapter 7 and the contribution of the study is stated.

In order to facilitate data analysis and the representation of findings, a topic worksheet was created (figure 3-4), linking the questions on the online questionnaire to sub-research questions thus deriving topic areas.
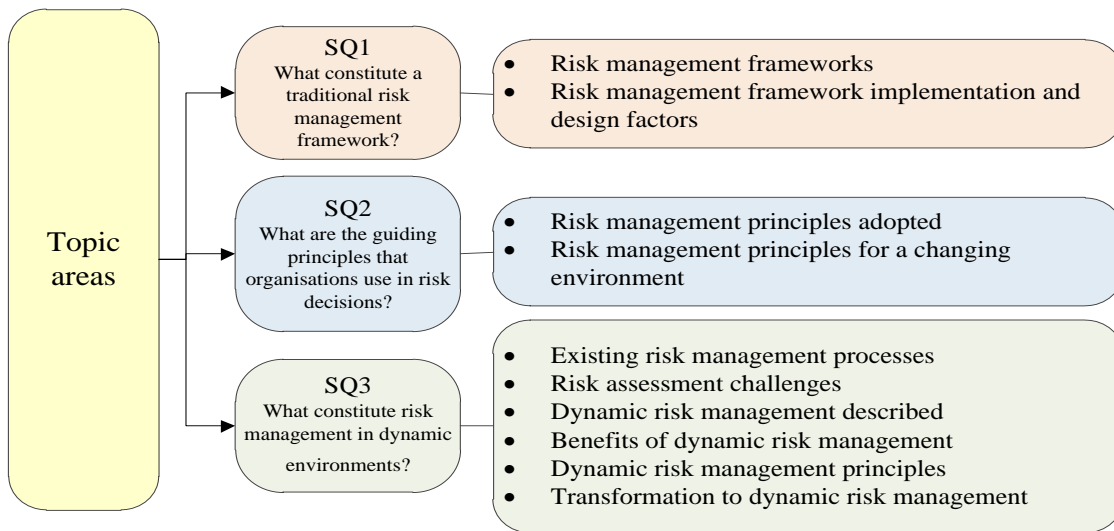
Figure 3-4: Topic areas mapping to research sub-questions

This topic area worksheet was used in the analysis of data, the presenting of findings as well as the development of themes that assisted in the development of the dynamic risk management framework.

3.5.6.1. Research Participants Selection

The following criteria and rationale were used in identifying the research participants for both the online questionnaire and interviews as depicted in table 3-8:

1. Research participants are risk practitioners, currently employed in a traditional, agile, virtual and exponential organisation;
2. Research participants are professionals working in a business area or unit that engages with the risk fraternity and who know risk frameworks;
3. Research participants have a broad understanding of risk management frameworks;
4. Research participants have some years working within a risk area or division; and
5. Research participants interest and participation in other platform to ensure that risk management remains relevant considering changing organisational landscape

Table 3-8 Main criteria and rationale for selecting the research participants

No	Main Criteria (MC)	Rationale
1	**MC1 (Risk Practitioner)** Risk practitioners, currently employed in a traditional, agile, virtual and exponential organisation.	To obtain a view of issues and benefits of the existing risk management frameworks, principles and practices.
		To gain an understanding of the most utilised and familiar risk frameworks.
		Gain a perspective on how dynamic risk management can be conducted considering organisational structures.
2	**MC2 (Risk Engagement)** Professionals working in a business area or unit that engages with the risk fraternity and who know risk frameworks.	To obtain a view of issues and benefits of the existing risk management frameworks, principles and practices.
		To gain an understanding of the most utilised and familiar risk frameworks.
		Gain a perspective on how dynamic risk management can be conducted considering organisational structures.
3	**MC3 (Risk Knowledge)** Broad understanding of risk management frameworks.	To gain an understanding of the most utilised and familiar risk frameworks.
		Gain a perceptive on how dynamic risk management can be conducted considering organisational structures.
4	**MC4 (Risk Skills and Expertise)** Years working within a risk area or division.	To obtain a view on how dynamic risk management can be conducted considering organisational structures.
5	**MC5 (Risk management relevance)** Interest and participation in other platforms to ensure that risk management remains relevant considering changing organisational landscapes.	To obtain a view of issues and benefits of the existing risk management frameworks, principles and practices.
		Gain a perspective on how dynamic risk management can be conducted considering organisational structures.

- *Online questionnaire research participants.* The online questionnaire research participants were selected based on: whether the research participants were risk practitioners (MC1), whether they were professionals who engage with the risk fraternity (MC2), their risk knowledge in terms of existing risk frameworks (MC3) and their level of risk skills and expertise (MC4) and the level of interest and participation in the risk management domain (MC5). These criteria were then used to provide the researcher with:

   - A view of issues and benefits of the existing risk management frameworks, principles and practices;

   - An understanding of the most utilised and familiar risk frameworks; and

- A perspective on how dynamic risk management can be conducted considering organisational structures.

By applying the criteria described in table 3-8; research participants across organisational divisions were selected in organisations that were from responsive organisations, including agile, virtual, digital, exponential and traditional. This selection allowed for a broader view on how risk management is applied in the various organisational structures as well as various perspectives from the participants across the organisational structures in terms of what constitutes dynamic risk management.

- *Semi-structured interviews participants.* For the semi-structured interviews research participants were selected based on their risk knowledge (MC3), risk skills and expertise (MC4), the organisational structure they were employed (MC1) and their participation and interest within the risk management domain (MC5). This provided the researcher with:
  - A view of issues and benefits of the existing risk management frameworks, principles and practices;
  - An understanding of the most utilised and familiar risk frameworks; and
  - A perception on how dynamic risk management can be conducted considering organisational structures.

Considering that the primary objective for conducting the semi-structured interviews was to evaluate the initial dynamic risk management developed. The initial version of the dynamic risk management framework was then enriched with the input obtained from the interview participants.

3.5.6.2. Sampling

The logical relationship between sample selection techniques and the purpose and focus of the research is important and has been considered; therefore sample size was dependent on the research question(s) and objectives to be addressed, what the research intended to establish, what is useful, what is credible and what can be done considering time and resources (Patton, 2002).Qualitative and quantitative methods of sampling are used within a study and choosing a study sample is an important step in any research study because it is not

practical or efficient to study the whole populations (Marshall, 1996a).The selection of an appropriate method of sampling is greatly dependent on the aim of the research.

Table 3-9: Comparison of quantitative and qualitative sampling methods (Marshall, 1996a)

	Quantitative	**Qualitative**
Philosophical foundation	Deductive, reductionist	Inductive, holistic
Aim	To test pre-set hypothesis	To explore complex human issues
Study Plan	Step-wise predetermined	Iterative, flexible
Position of researcher	Aims to be detached and objective	Integral part of research process
Assessing quality of outcome	Direct tests of validity and reliability using statistics	Indirect quality assurance methods of trustworthiness
Measures of utility of results	Generalizability	Transferability

The aim of quantitative research is to draw a representative sample from the population, so that the results obtained from the sample can be used to generalise back to the population so it is important to select the most appropriate sample method with relation to the research aim (Marshall, 1996a). In quantitative sampling the most common approach is to use random or probability samples.

- Random sample. This is one of the most well-known sampling strategies (Patton, 2002; Teddlie & Yu, 2007). The nature of the population is defined, and all members have an equal chance of selection.

- Stratified random sampling. This allows for subgroups to be studied in greater detail combining stratified sampling with random sampling.

- Cluster sampling. With this approach the researcher samples groups (clusters) that occur naturally in the population such as schools, hospitals or neighbourhoods instead of individuals (Teddlie & Yu, 2007)

In qualitative research the appropriate sample size is one that adequately answers the research question and the number of subjects usually becomes obvious as the study progress, as new

themes or explanations emerge from the data. Therefore a flexible research design and an iterative, cyclical approach to sampling, data collection, analysis and interpretation is required (Marshall, 1996b). There are three broad approaches to select a sample for qualitative study; namely,

- Convenience sample. This is the least rigorous technique and involves selecting participants based on their accessibility in terms of time and effort. It is therefore important to be more thoughtful in the selection approach so as to ensure that the subjects selected are justified for the study.

- Judgement sample. This is also known as purposeful sampling and is the most common technique used. For this technique the researcher actively selects the most productive sample to answer the research question. This may be done through the development of a framework of variables that may influence the individual's contribution and is based on the researcher's knowledge, literature as well as evidence within the study. This is a more intellectual strategy of sample selection.

- Theoretical sample. This builds interpretative theories from the emerging data and selects new samples to examine and elaborate on these theories. Theoretical sampling allows for flexibility during the research process (Coyne, 1997)

Table 3-10: Basic Sampling Designs (Kothari, 2009)

Element selection technique	Representation basis	
	Probability sampling	**Non-probability sampling**
Unrestricted sampling	Simple random sampling	Haphazard sampling or convenience sampling
Restricted sampling	Complex random sampling (e.g. cluster sampling, systematic sampling, stratified sampling, etc.)	Purposive sampling (e.g. quota sampling, judgement sampling)

The choice between quantitative and qualitative research methods should be determined by the research question, not by the preference of the researcher (Marshall, 1996a). Both snowball and convenience sampling were used to select the research participant.

- Snowballing

- Convenience sampling

Snowballing was selected as the suitable sampling technique due to the fact that in this research potential research participants may exist in multiple regions or companies and it would be of greater benefit (having more rich data) if asked to identify other research participants that would further identify other new potential participants (and so on) (Goodman, 1961). Within non-probability sampling, snowballing has been specifically selected as a suitable sampling technique. The reasons for this are mainly due to that fact that in this research the cases may exist in multiple regions or companies, and it would be of greater benefit (having more rich data) if cases could be asked to identify other cases and the new cases would further identify other new cases (and so on). In addition to that looking at the research objective, a large population would be more beneficial to this study and this can be achieved through this sampling technique of snowballing (figure 3-5).
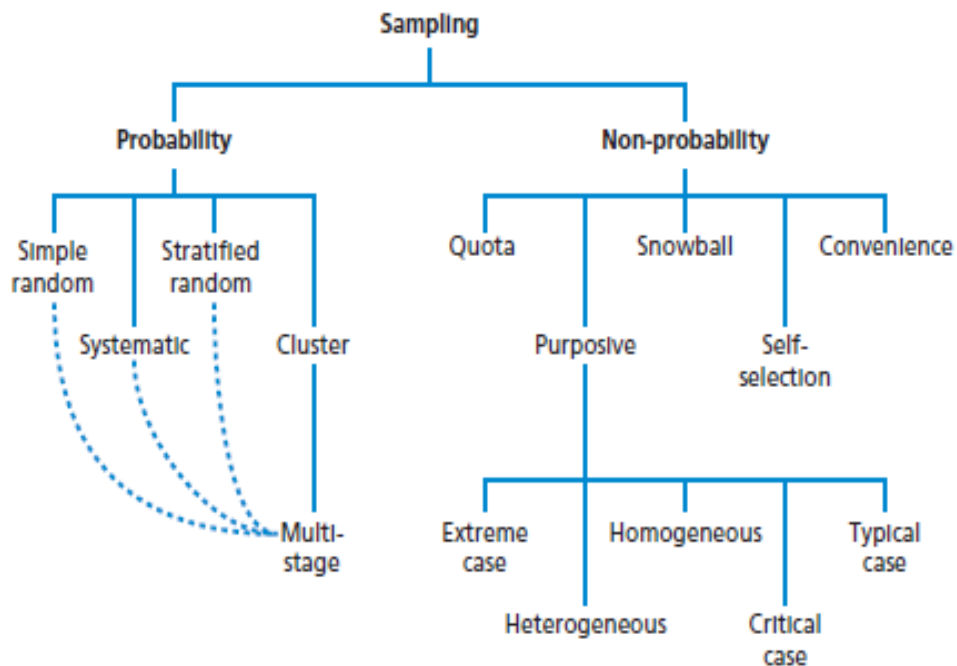
Figure 3-5: Sampling Techniques (Sauders et al., 2012)

Snowballing was done in one of two ways: either through submitting the potential research participants contact details (particularly email address) on the online questionnaire, or through directly forwarding the invitation to participate to the potential participants with the researcher copied in the mail so as to monitor and keep track of the sample size. Considering

the research topic and the research questions to be answered, a large population was more beneficial.

Convenience sampling was used as the second method of sampling in the evaluation phase of the study. Convenience sampling technique can be used in both qualitative and quantitative studies, since it is a type of nonprobability or non-random sampling where research participants are of the target population that meets certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate (Etikan, 2016). In addition, the research participants may also be easily accessible to the researcher. The research participants were selected based on the participant's interest in the study as well as their willingness to participate (Etikan, 2016). The sample selected through convenience sampling differs from the participants selected through snowballing in that all the participants selected are at a director or executive level, have more than 15 years' work experience and have an interest in how dynamic risk management can be conducted within dynamic environments. The main objective of using convenience sampling is to evaluate the initial dynamic risk management framework developed, enriching the initially developed framework with the data collected during the semi-structured interviews.

3.6. Ethics and Anonymity

Ethical considerations are of the utmost importance when conducting a research study and should be applied in all kind of research. The research process may create a sense of strain when it comes to the aim of the research to make generalizations for the good of others, and the right to maintain privacy (Orb, Eisenhauer, & Wynaden, 2001). Ethics applies to doing good and avoiding harm. Preventing harm is assured through the application of appropriate ethical principles when conducting the study.

It is for these reasons that it is of the utmost importance that a researcher obtains consent from the research participants for participation in the study. Furthermore the researcher should ensure that the right to privacy is expressed and demonstrate the commitment to ensure that information obtained during the study will be kept private and protected.

The nature of ethical concerns in qualitative research studies is subtle and different compared to the ethical concerns in quantitative research. Qualitative researchers focus their research on

exploring, examining, and describing people and their natural environments. Embedded in qualitative research are the concepts of relationships and power between researchers and participants (Orb et al., 2001). The desire to participate in a research study depends upon the participants' willingness to share their experience which is why the adherence to ethical principles is key.

The following guiding principles are provided (O'Brien, 1998; Orb et al., 2001)

- Informed Consent. The participants have a right to exercise their right as autonomous persons to voluntarily accept or refuse to participate in the study. Consent is a negotiation of trust and may be re-negotiated. Permission must be obtained before making observations or examining documents produced for other purposes.
- Beneficence. This embraces doing well and preventing harm, overseeing the potential consequences of revealing a participant's identity and understanding that this is a moral obligation. The researcher must accept responsibility for maintaining confidentiality.
- Justice. This involves avoiding the exploitation of participants and acknowledging the contribution of participant.

In this research study the researcher considered all the ethical principles and attempted to identify all possible violations of ethical standards to ensure that participating in the study would not harm any of the research participants.

Consent was obtained from research participants where applicable and feedback was confirmed where relevant. In order to ensure the anonymity of the research participants, no names were used for reflecting and reporting on the interview data collected. For the online questionnaire consent was requested before the participants continued with the questions. The names of the participants were not requested and not stored upon completion of the questionnaire. For the interviews held consent was obtained from the participants and for all interviews held names were not recorded. All participants were acknowledged for their participation through a thank you note upon completing the questionnaires and interviews.

3.7. Conclusion

Philosophical perspectives and research strategies were discussed as the research paradigm adopted contains important assumptions about the way in which the research will be understood, conducted and investigated with the understanding that it is the choice of paradigm that sets down the intent, motivation and expectations for the research. The various strategies of inquiry and methods, qualitative, quantitative and mixed were looked at in detail and a summary of these was provided as well as the research phases carried out in the research. The mixed methods research design method was chosen as the most suitable research method for this particular study, having adopted an interpretivist worldview.

In this chapter the researcher described how the research was conducted in order to address the problem statement, describing in detail the data collection and analysis, the research participant selection as well as the sample techniques used in this study. The data collection methods are mapped per sub-research question and a topic area worksheet is introduced. The topic area worksheet is then later used in chapter 4 for the data analysis and summarised per topic area in chapter 5 for the integration of findings thus developing the first version of the dynamic risk management framework.

The research participant selection criteria are presented, describing both the online questionnaire and semi-structured interview so as to show how these participants were selected. Lastly, the ethical and anonymity principles are described, and the ethical measures applied in this study are highlighted.

PART 3: Data Analysis and Integration of findings

Part 3 of this study consists of chapter 4 and chapter 5. In chapter 4 data analysis is discussed and in chapter 5 findings are integrated taking into consideration both literature and questionnaire thus resulting in the development of the initial dynamic risk management framework.

Chapter 4: Data Analysis

4.1. Introduction

This chapter focuses on the results of the data collection, providing an introduction and explanation of questions and a consolidation with the literature review. In section 4.2 the questionnaire data collection method is described and in section 4.3 an analysis of the data is done for the data received as part of the online survey. In section 4.4 a summary of findings is presented per topic areas and in section 4.5 a conclusion is given.

| Part 3: Research Plan and Design |
| Chapter 4: Data Analysis |

Section 4.1
Introduction

Section 4.2.
Survey data collection

Section 4.3.
Survey data analysis

Section 4.3.1. Respondent consent

Section 4.3.2. Respondent profile

Section 4.3.3: Risk management framework

Section 4.3.4: Risk management principles

Section 4.3.5:Existing risk management process and challenges

Section 4.3.6. Dynamic risk management described and perceived benefits

Section 4.4.
Summary of Findings

Section 4.4.1. Topic Area – Risk Management Framework

Section 4.4.2. Topic Area – Risk Management Principles

Section 4.4.3: Topic Area – Risk Management Process

Section 4.4.4: Topic Area – Dynamic Risk Management

Section 4.5.
Conclusion

Figure 4-1: Overview of chapter 4

4.2. Questionnaire Data Collection

The questionnaire was loaded onto a survey tool, Survey Monkey, and the survey application functionality was used to obtain feedback on the survey. A web link to the survey, together with an explanation of its purpose, was emailed to the identified target audience, which comprised of 319 research participants representing various organisational structures; namely, traditional, agile, virtual and exponential. The sample technique that has been used for the online questionnaire was snowballing (Goodman, 1961), meaning that the research participants selected could recommended potential participants. In the questionnaire the last question (Q15) was used to request and collect these participants. The total recommended potential participants from the last question were 24, which then meant that the total population of participants was **343.** The total number of respondents for the survey was **183**, thereby resulting in a response rate of **53%.** In addition to that a survey was used to obtain consent from the participants (Q1). The findings of this survey are discussed in detail in section 4.3.

4.3. Data Analysis

In order to facilitate data analysis and the representation of findings, a topic worksheet was applied linking the sub-research questions to questionnaire questions and sections so as to create research topic areas (figure 4-2). Totals of the responses reported on were collated, and the content was analysed using a topic worksheet in order to establish themes.
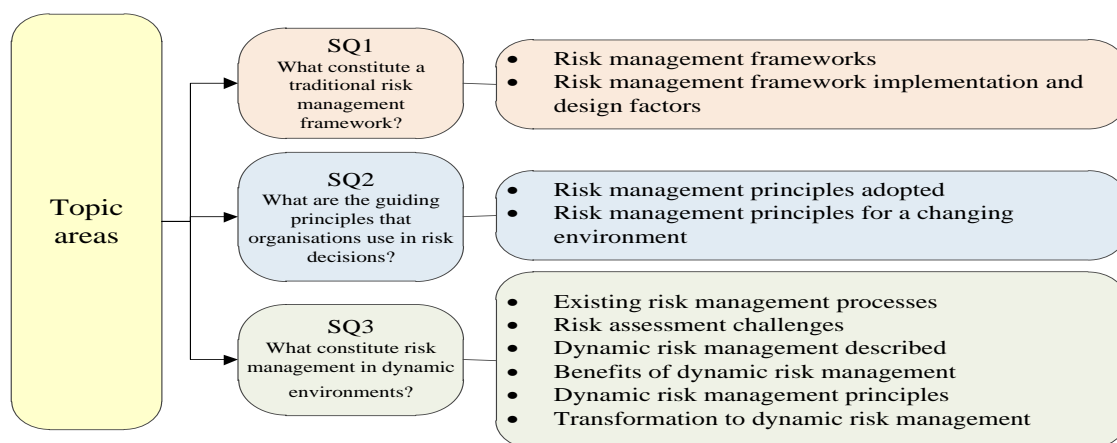
Figure 4-2: Topic areas mapping to research sub-questions

This section contains feedback on each question in the survey and this will be linked to the topics represented within the topic worksheet.

4.3.1. Respondent's Consent

The purpose of the first questions in the survey was to determine whether the research participant had read and understood the information provided about the study in terms of who the researcher was, the topic, the ethics and the anonymity of the study. Most importantly the first question was used to obtain consent from the research participant. In response to question 1 as depicted in Table 4-1, 183 respondents answered the question, where 182 responded 'yes' and 1 responded 'no'.

Table 4-1: Question 1_ - Survey participant consent

Question 1: Please indicate that you have: Read and understood the information provided above. You give your consent to participate in the study on a voluntary basis.

Answer Choices	Percentage of responses	Number of responses
Yes	99,45%	182
No	0,55%	1
	Answered	**183**
	Skipped	**0**

Respondent's consent summary:

Of the research participants, 182 respondents responded 'yes' and could therefore proceed with answering the questionnaire; 1 respondent responded 'no' and was therefore thanked and directed to the end of the questionnaire.

4.3.2. Respondent Profiles

In order to gain an understanding of the participant's profile four questions were asked; namely, questions 2, 3, 4 and 5. The purpose of these four questions was to determine the survey participant's job function, the number of years they had worked, their job level and the type of organisational structure they worked in. Both risk practitioners and business

professionals of other areas within business were represented. Each question in this section will now be reported on.

In response to the question 2 as shown in Table 4-2, 178 respondents responded to their job function and 5 participants skipped the question. Of the 178 respondents, the two highest responses received were from respondents in risk (14.04% of the respondents) and information technology (13.48% of respondents).

Table 4-2: Question 2 - Respondent job profiles

Question 2: Which of the following best describe your job function?		
Answer Choices	**Percentage of responses**	**Number of responses**
Accounting	1,12%	2
Administrative	4,49%	8
Advertising / Marketing	4,49%	8
Analyst	7,30%	13
Business Development	2,25%	4
Consulting	1,12%	2
Customer Service	0,56%	1
Compliance	6,74%	12
Finance	7,30%	13
Forensic	6,18%	11
General Business	1,69%	3
Human Resources	1,69%	3
Information Technology	13,48%	24
Legal	2,25%	4
Management	7,87%	14
Project Management	2,25%	4
Quality Assurance	0,56%	1
Research	1,12%	2
Risk	14,04%	25
Sales	1,69%	3
Strategy/Planning	3,37%	6
Supply Chain	0,56%	1
Other (please specify)	7,87%	14
	Answered	**178**
	Skipped	**5**

In response to the question 3 as depicted in Table 4-3, 178 respondents responded to their years of experience and 5 participants skipped the question. Of the responses received more

than half, 51.12% of respondents had worked 11-20 years; followed by 16.85% who had been working for 21-30 years and 10.11% of respondents who had worked for less than 5 years.

Table 4-3: Question 3 - Respondent profiles based on the years of experience

Question 3: How many years have you been working?		
Answer Choices	**Percentage of responses**	**Number of responses**
< 5 years	10,11%	18
5 - 10 years	16,29%	29
11 - 20 years	51,12%	91
21 - 30 years	16,85%	30
31 - 40 years	5,06%	9
40 years above	0,56%	1
	Answered	**178**
	Skipped	**5**

In response to the question 4 as depicted in Table4-4, 178 respondents responded to what their job level was, 5 participants skipped the question and 6 selected 'other'. From the 178 respondents, 29.21% were middle managers, 27.53% were at employee level and 23.60% were senior management. Of the 6 out of the 178 respondents who selected 'other', 4 stated that they were specialists, 1 was a data analyst intern and 1 an administrator.

Table 4-4: Question 4 - Respondent profiles based on job level

Question 4: What job level are you at?		
Answer Choices	**Percentage of responses**	**Number of responses**
Executive / Director	7,87%	14
Senior Manager	23,60%	42
Middle Manager	29,21%	52
Junior Manager	5,62%	10
Employee	27,53%	49
Self-Employed	1,12%	2
Academic	0,00%	0
Retired	0,00%	0
Graduate	1,69%	3
Other (please	3,37%	6

specify)		
	Answered	**178**
	Skipped	**5**

In response to the question 5 as depicted in Table 4-5, 178 respondents responded to the question of what organisational structure they were working in, namely agile, virtual, traditional or exponential. From the responses received on question 5, 4 participants skipped the question. More than half of the respondents (65.73%) were working in a traditional organisational structure, 19.66% in agile organisations and 5.06% in digital organisations. In addition to that of the 178 respondents received, 9 respondents indicated that they were working for organisations that were a hybrid or mix between agile, digital and traditional.

Table 4-5: Question 5 - _ Respondent profiles in terms of their organisational structure

Question 5: What type of organisation or organisational structure do you work for?		
Answer Choices	**Percentage of responses**	**Number of responses**
Traditional organisation with a structure that has a leader and multiple layers of subordinates or divisions	65,73%	117
Agile organisation that is quick in responding to changes in the marketplace or environment as well as the emergence of new competitors	19,66%	35
Virtual organisation with virtual teams that is located throughout the country or the world requiring information technology to support their work and communication.	2,81%	5
Digital organisation which enable their core business relationships with employees, customers, suppliers, and other external partners through digital networks.	5,06%	9
Exponential organisation that has a larger growth (at least 10 times larger) compared to its peers because they make use of new organisational techniques that leverage exponential technologies.	1,69%	3
Other (please specify)	5,06%	9
	Answered	**178**
	Skipped	**5**

<u>Respondent profiles summary:</u>

In question 1 where consent is obtained from the research respondents, 182 responded 'yes' therefore those respondents were directed to the next section of the questionnaire where the researcher would be able to obtain some information from the respondents. In the respondent profile section only 178 respondents answered the questions therefore indicating that 4 of the respondents that had said 'yes' to question 1 chose not to continue with the questionnaire. Therefore, the respondent profile is based on 178 respondents, with the two highest responses received being from the risk and information technology community. More than half, 51.12% of respondents had worked 11-20 years followed by 16.85% who had been working for 21-30 years. That would therefore suggest that the respondents that had answered the questionnaire are highly experienced with work experience ranging from 11-30 years.

In terms of the organisational structure in which the respondents worked, half of the respondents (65.73%) were working in a traditional organisational structure, 19.66% in agile organisations and 5.06% in digital organisations. In addition to that 19.7% were respondents working in organisations that were a hybrid or mix between agile, digital and traditional structures. That would then signify that of the results received more than half of the population were working in an organisation that was linear in nature, with challenges to flexibility, innovation and speed which are success factors that allow an organisation to be responsive.

4.3.3. Risk Management Frameworks

The purpose of this section of the questionnaire was to establish the risk management frameworks with which respondents were familiar and elements key to the successful implementation and / or design of a risk management framework. This section addresses the question posed by SQ1, as depicted in figure 4-3.
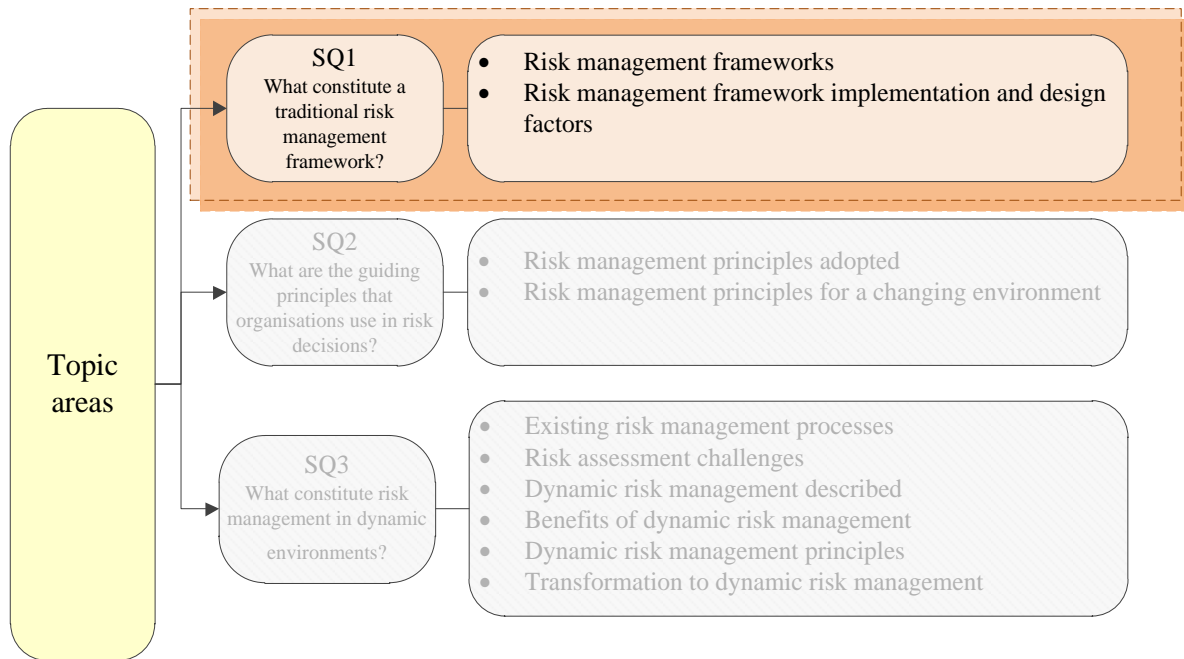
Figure 4-3: Top areas mapped to the sub-question 1 (SQ1)

In response to question 6 as depicted in Table 4-6, 142 respondents responded to the question of the risk management framework with which they were familiar and 41 participants skipped the question. Of the 142 respondents 30.99% were familiar with ISO31000:2009, 19.72% were familiar with all the frameworks offered in the question and 16.90% were familiar with COSO 2004. In addition to that 9.15% of the respondents selected 'other', specifying Cobit and ISO19011:2018 Guideline for Audit Management Systems as standards or frameworks with which they were familiar.

Table 4-6: Question 6 - Risk management frameworks respondents are familiar with

Question 6: Which frameworks are you familiar with? Select all relevant responses.		
Answer Choices	**Percentage of responses**	**Number of responses**
ISO 31000 2009 – Risk Management Principles and Guidelines	30,99%	44
ISO/IEC 31010:2009 - Risk Management - Risk Assessment Techniques	8,45%	12
COSO 2004 - Enterprise Risk Management - Integrated Framework	16,90%	24
All of the above	19,72%	28
None of the above	38,03%	54
Other (please specify)	9,15%	13
	Answered	**142**
	Skipped	**41**

In response to question 7 as depicted in Table 4-7, 143 respondents responded to the question of the risk management framework design and implementation factors. From the responses received on question 7, 40 participants skipped the question. The top four factors for the successful design and implementation of a risk management framework were stated as:

1. The risk management framework's consideration of external and internal context of the organisation at 65.73% (external and internal context);

2. The framework's ability to assist with the integration of risk management within the organisation at 67.14% (integration);

3. That the accountability for the developing, implementing and maintaining the framework has been assigned, 58.03% (accountability); and

4. The review of the risk framework in response of change, 51.75% (responsiveness).

Table 4-7: Question 7_ Risk Management framework design and implementation factors

Question 7: Please answer the following based on your organisation's risk management framework.

	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
The organisations risk management frameworks consider both the external and internal context of the organisation.	2.10% 3	6.29% 9	25.87% 37	48.25% 69	17.48% 25	143	3.73
The organisations risk management frameworks assist the organisation to integrate risk management within its overall risk management system.	3.50% 5	7.69% 11	21.68% 31	54.55% 78	12.59% 18	143	3.65
Accountability for developing, implementing and maintaining the framework has been assigned.	2.80% 4	6.99% 10	32.17% 46	43.36% 62	14.69% 21	143	3.60
We periodically review our risk management policy and frameworks in response to changes.	3.50% 5	11.89% 17	32.87% 47	40.56% 58	11.19% 16	143	3.44
The organisation ensures that the framework for managing risk continue to remain appropriate	4.90% 7	12.59% 18	30.77% 44	39.86% 57	11.89% 17	143	3.41
Key components of the risk management framework, and subsequent modifications are communicated appropriately	4.90% 7	16.78% 24	35.66% 51	35.66% 51	6.99% 10	143	3.23
There is adequate internal reporting on the framework, its effectiveness and the outcomes	5.59% 8	18.18% 26	33.57% 48	36.36% 52	6.29% 9	143	3.20

Risk Framework Summary

In response of the risk framework section, 142 respondents responded to the question of the risk management framework with which they were familiar and 41 participants skipped the question. Of the 41 respondent that had skipped question 6, one was the respondent that had not provided consent to continue with the questionnaire. In the instance of the 40 respondents that skipped question 6 it may be that they did not have knowledge about risk frameworks.

The responses received indicated that 30.99% were familiar with ISO31000:2009 and 16.90% with COSO 2004. In addition to that 9.15% of the respondents selected 'other', specifying Cobit and ISO19011:2018 Guideline for Audit Management Systems as standards or frameworks with which they were familiar. Respondents who responded to this question were those who were familiar with frameworks and standards and they highlighted that the

top four factors for the successful design and implementation of a risk management framework were: understanding organisational context (internal and external), integration to organisational processes, accountability and responsiveness.

4.3.4. Risk Management Principles

The purpose of this section of the questionnaire was to gain an understanding of the risk management principles currently adopted within the organisations in which the respondents worked as well as other values that they considered to be appropriate for the successful implementation of a risk management framework in a changing environment. This section addresses the question posed by SQ2, as depicted in figure 4-4
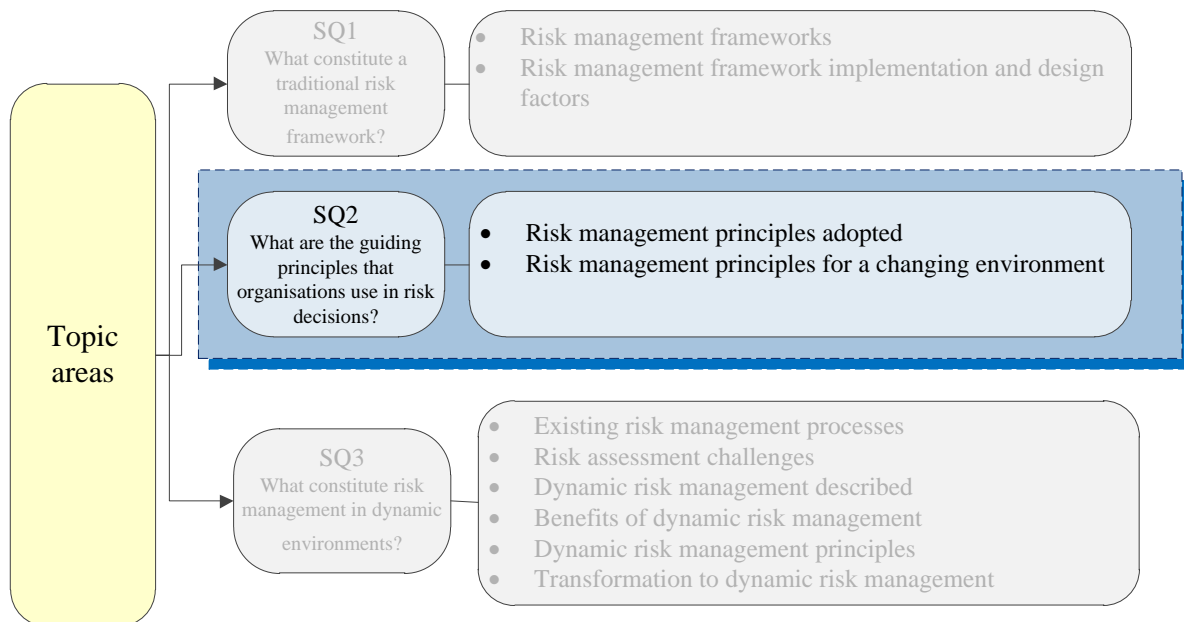
Figure 4-4: Topic area mapped to the sub-question 2 (SQ2)

In response to question 8 as depicted in Table 4-8, 135 respondents responded to the question of the risk management principles adopted within their organisations.

In addition to the rating scale question, a free text question was asked of the survey respondents regarding other principles they would consider key in a changing environment. The survey respondents' comments are presented in Annexure A: A-4.

Table 4-8: Question 8 -_ Risk Management principles

Question 8: Please complete the following questions with reference to your risk department.

	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
Risk management creates value.	2.22% 3	9.63% 13	20.74% 28	42.96% 58	24.44% 33	135	3.78
Risk management is an integral part of organizational processes.	3.70% 5	14.07% 19	14.81% 20	44.44% 60	22.96% 31	135	3.69
Risk management is part of decision making.	5.19% 7	14.07% 19	17.78% 24	42.22% 57	20.74% 28	135	3.59
Risk management is about diversity in skills and expertise.	5.93% 8	12.59% 17	21.48% 29	45.93% 62	14.07% 19	135	3.50
Risk management practices are systematic, planned and structured.	5.19% 7	11.11% 15	25.19% 34	45.93% 62	12.59% 17	135	3.50
Risk management is aligned with the organization's external and internal environment.	4.44% 6	13.33% 18	27.41% 37	45.19% 61	9.63% 13	135	3.42
Risk management is tailored to the organisations business areas.	5.93% 8	16.30% 22	21.48% 29	43.70% 59	12.59% 17	135	3.41
Risk management facilitates continual improvement and enhancement of the organisation.	5.93% 8	15.56% 21	22.96% 31	42.96% 58	12.59% 17	135	3.41
Risk management is transparent and inclusive of business	4.44% 6	17.04% 23	25.93% 35	40.00% 54	12.59% 17	135	3.39

Risk Management Principles Summary

From the responses received on question 8, the top three principles were stated: creating value, risk being an integral part of business processes and the fact that risk management should be part of decision making within the business.

4.3.5. Existing Risk Management Process and Challenges

The purpose of this section of the questionnaire was to gain an understanding of the existing risk management processes in the various organisational structures as well as the challenges currently faced regarding the risk assessment process, looking at traditional risk management in relation to dynamic risk management processes. This section addresses the question posed by SQ3, as depicted in figure 4-5 looking at risk management in a traditional environment and considering what would constitute risk within a dynamic environment.
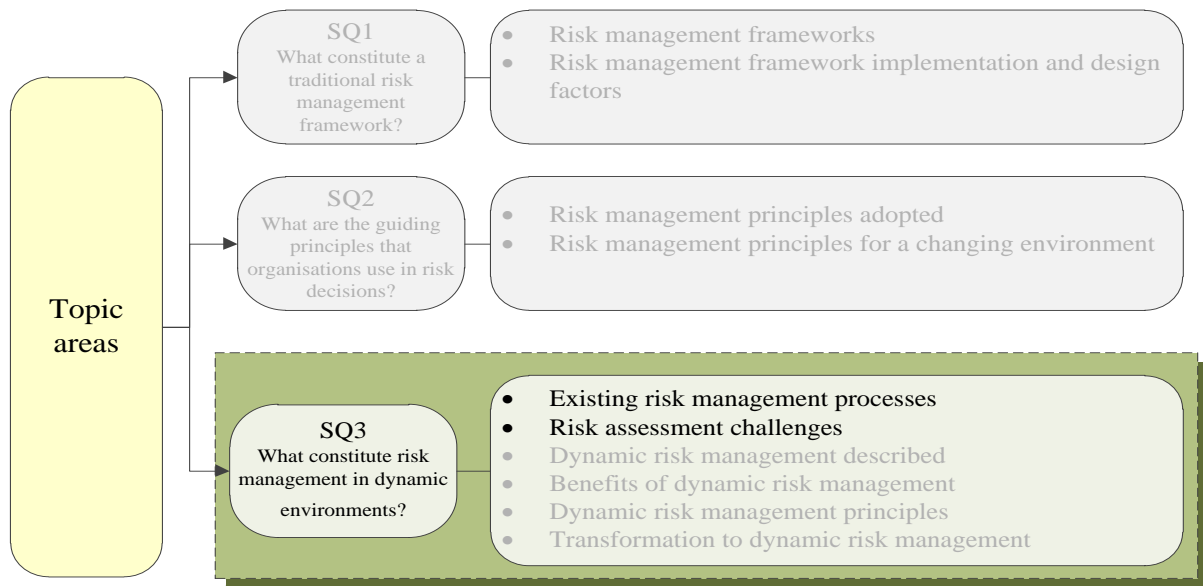
Figure 4-5: Topic areas mapped to sub-question 3 (SQ3) _Risk management processes and challenges

In response to question 9 as depicted in Table 4-9, 125 respondents responded to the question regarding the risk management processes followed within the organisation. The top three considerations for the risk assessment process or way of work from the respondents were that:

1. Business and risk are responsible for planning of contingencies;
2. Risk management must satisfy the customer through the early and continuous identification of risks; and
3. Both business and risk are responsible for implementing the desired controls.

Table 4-9: Question9 - Existing risk management processes

Question 9: Think about your ways of work and consider the risk management process in your risk department, then select the most appropriate answer from the statements below.

	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
When risks have been defined the risk fraternity together with business are responsible for the planning of contingency.	4.80% 6	12.80% 16	20.80% 26	48.80% 61	12.80% 16	125	3.52
Risk management is about satisfying the customer through early and continuous identification and resolution of risks	4.00% 5	14.40% 18	21.60% 27	45.60% 57	14.40% 18	125	3.52
Both business and the risk fraternity are responsible for implementing the desired controls.	3.20% 4	17.60% 22	20.80% 26	47.20% 59	11.20% 14	125	3.46
There is continuous communication and consultation with business by risk management.	3.20% 4	24.80% 31	22.40% 28	41.60% 52	8.00% 10	125	3.26
Risk is measured by also considering the speed at which one can respond to a risk (velocity)	8.00% 10	17.60% 22	21.60% 27	45.60% 57	7.20% 9	125	3.26
Brainstorming sessions are held with relevant stakeholders where all conceivable risks are itemized.	6.40% 8	25.60% 32	27.20% 34	32.80% 41	8.00% 10	125	3.10
Only risk management is responsible for the monitoring and reviewing of risk.	11.20% 14	47.20% 59	22.40% 28	16.80% 21	2.40% 3	125	2.52

Question 10: In your own words, what are the challenges currently faced when conducting risk assessments?

In response to question 10, 125 respondents responded to the question regarding the challenges experienced when conducting risk assessments, Annexure A.4. Of the responses received on question 10, 58 participants skipped the question. Some of the challenges highlighted by the remaining respondents were:

- Time constraints;
- Lack of collaboration;
- Risk being removed from business; and
- The risk assessment process being done separately from business as usual processes.

Existing risk management processes and challenges summary

The respondents indicated that both business and risk are responsible for planning of risk as well as the implementation of desired controls within business but also highlighting challenges that may exist; such as, time constraints, the lack of collaboration, risk

assessments being a separate process to business activities and risk being removed from what business does.

4.3.6. Dynamic Risk Management Described and Perceived Benefits

The purpose of this section of the questionnaire was to determine from the survey participants how they would describe the dynamic risk management principles and approach, the perceived benefits of dynamic risk management as well as the transformation towards the adoption dynamic risk management. This section also addresses the question posed by SQ3, as depicted in figure 4-.6 looking at risk management in a traditional environment and considering what would constitute risk management within a dynamic environment
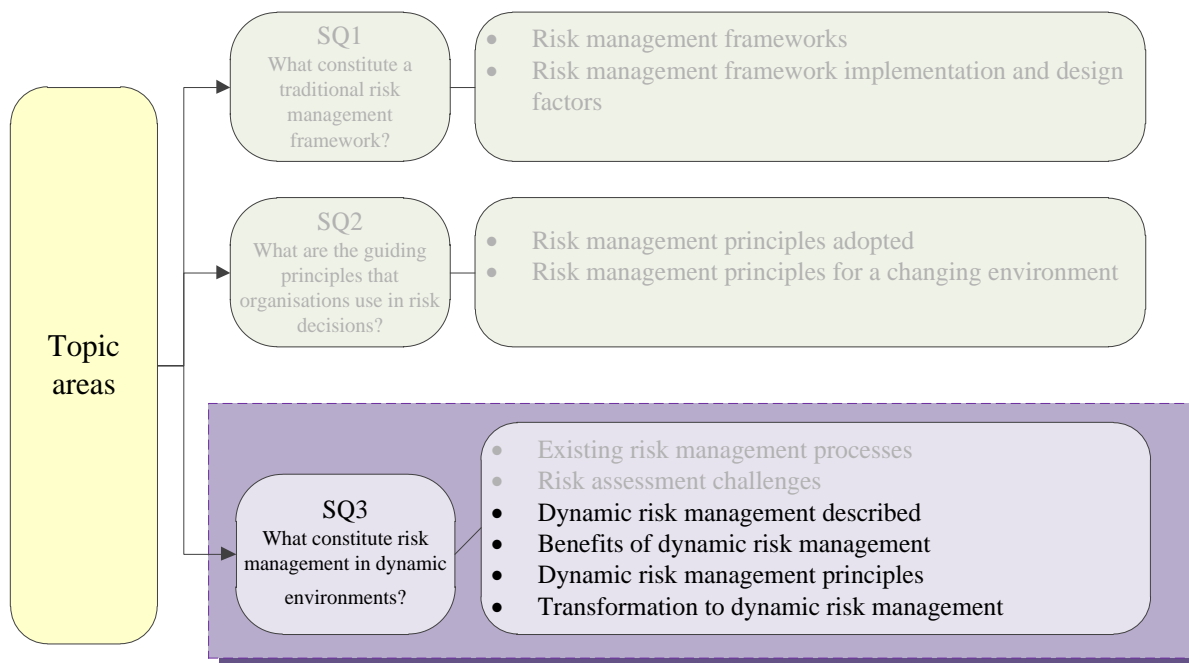
Figure 4-6: Topic areas mapped to sub-question 3 (SQ3) _Dynamic risk management described and perceived benefits

In response to question 11 as depicted in Table 4-10, 118 respondents responded to the question regarding how they would describe dynamic risk management, considering the risk principles and process. Fifty eight (58) participants skipped the question. From the remaining responses received 88.98% described it as having continuous engagement with stakeholders,

88.14% described it as having continuous engagement with business and 83.90% described it as being responsive to change. In addition to the 118 responses received, 14 respondents described dynamic risk management in their own words, Annexure A: A-4.

Some of the ways in which respondents described dynamic risk management were:

Quote 1: "Not only the mitigation of risk, but the identification of opportunities to exploit i.e. risks we are able to manage that our competitors are struggling with, and exploiting this to gain advantage.'

Quote 2: "Actively and creatively use data and analytics"

Quote 3: "Adapting industry wide standards (ISO 31000 et al) to specific business context"

Quote 4: "Risk management should be at the forefront with business stakeholders and business innovation. They should assist with determining risks for future ventures and be part of the process to mitigate those towards successful implementation and roll out of these ventures."

Table4-10: Question11 -_Dynamic risk management described

Question 11: How would you describe dynamic risk management? Select all relevant responses.

	Responses	
Answer Choices	**Percentage of responses**	**Number of responses**
Iterative risk management process	54,24%	64
Collaboration with business	88,14%	104
Following of best practice	42,37%	50
Systematic and planned approach	45,76%	54
Tailored to business	70,34%	83
Once-off process	2,54%	3
Continuous engagement with stakeholders	88,98%	105
Responsive to change	83,90%	99
Risk is embedded within business	78,81%	93
Diverse risk teams across various skills, expertise and qualifications	70,34%	83
Value-based prioritization of risk efforts	55,93%	66
Time-boxing, fixing a certain amount of time for each risk process or activity so as to create value on time spend	22,03%	26
Monthly and / or quarterly reporting to risk governance structures	52,54%	62
Any other way you would describe dynamic risk management?		14
	Answered	**118**
	Skipped	**65**

Question 12: What benefit do you think the change to more dynamic risk management framework, principles and practices would bring to the organisation?

In response to question 12, 118 respondents responded to the question regarding the benefits that they think the change to a more dynamic risk management framework, principle and practice would bring to the organisations in which they worked, Annexure A.4. Of the responses received on question 12, 65 participants skipped the question. Some of the benefits listed by the respondents were:

- Risk would be more responsive and better able to assist business in identifying risks and opportunities;
- Business would be able to handle issues quicker and risk would in turn be able to support business in decision making;
- Risk management would be timeous thus supporting decision making; and
- There would be seamless integration of risk controls.

In response to question 13 as depicted in Table 4-11, 118 respondents responded to the question regarding the factors that they would consider when implementing and designing a dynamic risk management framework, principles and process, table 4-11 Of the responses received on question 13, 65 participants skipped the question. In designing a dynamic risk management framework, the remaining respondents mentioned the following top three factors:

1. Risks should be reported as and when they are identified;
2. Dynamic risk management practices should be transformable so as to cater for changing organisations; and
3. Dynamic risk management should be iterative and responsive to change.

In addition to the 118 responses received, 17 respondents described in their words the elements that they considered would need to be incorporated within a dynamic risk management approach, Annexure A: A-4. Some of the factors described in the respondents' own words were:

- Flexibility to act immediately;
- Accountability; and
- Different dynamic risk approaches for different operations.

Table 4-11: Factors for designing and implementing a Dynamic risk management framework, principles and process

Question 13: If you had to design a risk dynamic risk management framework how would you answer the statements below?

	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
Risks should be reported as and when they are identified to business	6.78% 8	4.24% 5	5.93% 7	40.68% 48	42.37% 50	118	4.08
Dynamic risk management practices should be transformed to cater for the changing organisation	7.63% 9	0.85% 1	8.47% 10	46.61% 55	36.44% 43	118	4.03
Dynamic risk management is iterative and responsive to change.	7.63% 9	0.00% 0	12.71% 15	43.22% 51	36.44% 43	118	4.01
Dynamic risk management effectiveness depends upon both agility and resilience	6.78% 8	1.69% 2	11.02% 13	50.85% 60	29.66% 35	118	3.95
Risk indicators to be tracked and monitored should be directly aligned with the business performance indicators	7.63% 9	2.54% 3	11.86% 14	44.92% 53	33.05% 39	118	3.93
Dynamic risk management should only consider key drivers and trends impacting on the organisations objectives	10.17% 12	33.05% 39	19.49% 23	27.12% 32	10.17% 12	118	2.94

Question14: Considering all the answers above, how would you transform your current risk management process to be more dynamic?

In response to question 14, 118 respondents responded to the question regarding how they would transform their current risk management process to be more dynamic, Annexure A: A-4. Of the responses received on question 14, 65 participants skipped the question. Some of the responses received by the remaining respondents for question 14 were:

- Embedding risk within business;
- Business and risk working more closely; and
- Inclusiveness of different expertise and continuous focus on gaining an understanding of business as it changes.

Question 15: Please provide me with potential participants by typing in their email addresses.

Question 15 was asked at the end of the online survey as a means of obtaining additional respondents.

<u>Dynamic risk management described and perceived benefits summary</u>

From the responses dynamic risk management was described as having continuous engagement with business and key stakeholders but also being responsive to change. The benefits highlighted were: being a business facilitator, being responsive to change, assisting business in identifying risks and opportunities and enabling business to handle issues quicker thus supporting the decision making process of business. With that said the respondents indicated that the risk management process in a dynamic environment should consider other factors; such as, risks being reported as when they are identified, practices should be transformable so as to cater for changing organisations, and dynamic risk management should be iterative and responsive to change.

Dynamic risk management described by respondents in their words was:

- Flexibility to act immediately;

- Accountability; and

- Different dynamic risk approaches for different operations.

- Embedding risk within business;

- Business and risk working more closely; and

- Inclusiveness of different expertise and continuous focus on gaining an understanding of business as it changes.

4.4. Summary of Findings

The research findings are grouped in themes that were derived during the research questionnaire design process. There are six themes; namely, respondent consent, respondent profile, risk management framework, risk management principles, existing risk management process and challenges, and dynamic risk management described and perceived benefits.

The themes are reflected in two main categories which are derived primarily due to the respondent; namely respondent consent and respondent profile. The first theme, respondent consent, is based on the ethical requirements that need to be observed within this study as well as the anonymity of the research respondent. The second theme, respondent profile, is based on the criteria and rationale used in identifying the research participants.

The second main category of themes was identified in relation to the questionnaire and from there a topic worksheet was developed with the topic areas: risk management framework, risk management principles, risk management process, and dynamic risk management. These topics were defined based on the questionnaire linked to the sub-research questions.
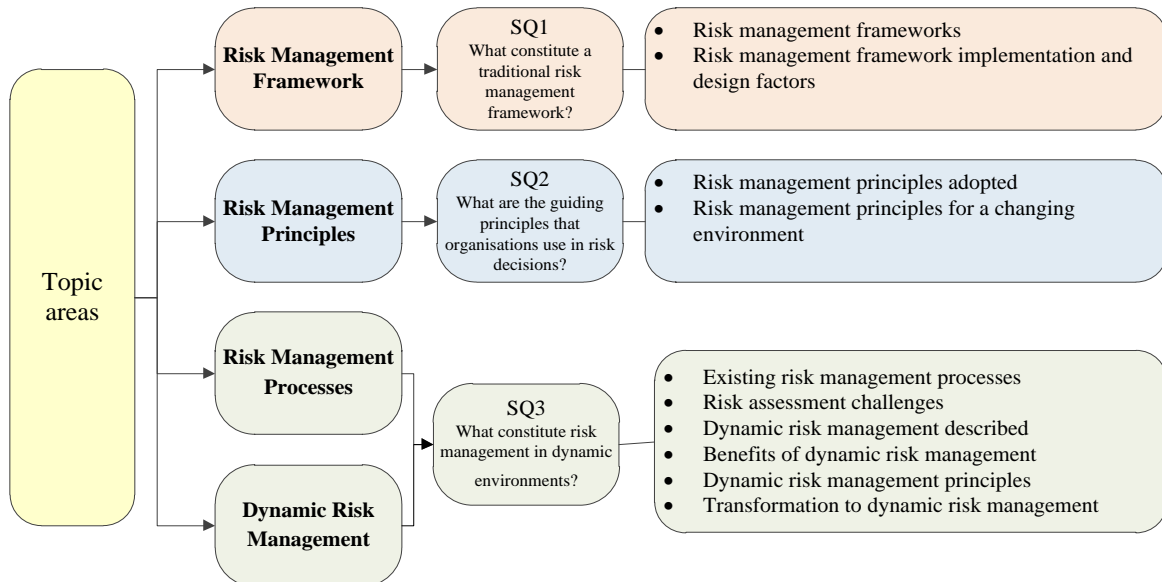

Figure 4-7: Topic areas mapping to research sub-questions

Significant amounts of data were collected during the study and for that reason the topic area worksheet (which maps the sub-research question and the survey questions), table 4-12, 4-13, 4-14, and 4-15 will be used to depict the data collected. The topic was based on the questionnaire and these were then linked to the sub research question that it aims to address.

4.4.1. Topic Area – Risk Management Framework:

Risk management principles and guideline ISO3100 provides a generic guideline and it is not intended to impose uniformity of risk (Fraser & Simkins, 2010). ISO is currently best practice for risk management frameworks and incorporates best practice from COSO (Fraser & Simkins, 2010). The COSO ERM cube on the other hand is well-known to risk management practitioners and it provides a framework for undertaking ERM. It has gained considerable influence because it is linked to the Sarbanes-Oxley requirements for companies listed in the United States (Moody, 2011).

To gain an understanding of the risk management frameworks the research participants were asked in question 6 about the risk management frameworks and standards with which they were familiar and asked in question 7 to rate the risk framework design and implementation factors as per the rating scale (Refer to APPENDIX: A2 – Section 3: Question 6 and 7).

Considering the response received from the research participants on question 6 of the online questionnaire, it is evident that the risk frameworks familiar to the risk fraternity as well as business are ISO3100 and COSO. Of the 142 respondents 30.99% were familiar with ISO31000:2009, and 16.90% were familiar with COSO 2004. In addition to that 9.15% of the respondents selected 'other', specifying Cobit and ISO19011:2018 Guideline for Audit Management Systems as standards or frameworks with which they were familiar.

Table 4-12: Summary of findings for question 6

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
Risk Management frameworks	SQ1	6	Gain an understanding of risk management frameworks that respondents are familiar with	• ISO31000 and COSO 2004 are the most familiar, between the two ISO31000 is the most commonly known framework • Other known frameworks are Cobit and ISO19011:2018 Guideline for audit management systems.

To determine the risk management design and implementation factors, question 7 was asked on the online questionnaire (refer table 4-13).

According to literature, the risk management process should be customised to suit the context of an organisation both internally and externally (Nair et al., 2013). From the responses received on question 7 there is an alignment with literature in terms of the understanding of internal and external context. In addition to that organisations need to understand the overall level of risk embedded within their processes and activities, because it is important for organisations to recognize and prioritize significant risks and identify the weakest critical controls. This approach enables a risk management initiative to deliver outputs of increased

organisational performance (S. Soltanizadeh et al., 2016) including compliance with applicable governance requirements, assurance to stakeholders regarding the management of risk and improved decision making.

Table 4-13: Summary of findings for question 7

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
Risk Management framework	SQ1	7	Determine the risk management design and implementation factors.	• Consideration of the external and internal context of the organisation • Integration of risk management within the organisation • Accountability for the development, implementation and maintenance of the framework should be well understood

According to (ISO, 2009), to be successful risk management should function within a risk management framework that provides the foundation that will be embedded throughout the organisation at all levels. In addition to that the risk management framework adopted by the organisation should be customised and proportionate to the organisation's internal and external context (International Standards Organisation, 2018), therefore risk management frameworks should assist the organisation to integrate risk management by adopting components of the framework specific to the organisation's needs.

4.4.2. Topic Area – Risk Management Principles

To determine the risk management principles to be adopted within an organisation considering the change in environments, question 8 was asked as part of the online questionnaire (Refer to APPENDIX: A2 – Section 4: Question 8).

For the topic area risk management principles, the responses from participants indicated that risk management principles to be adopted are: flexibility, inclusiveness, being embedded in business, value creation and also integration to business processes. Ashkenas (1995) presents

the change in paradigm for organisational success, summarising the success factors of new organisational designs as being speed, flexibility, integration and innovation. Risk management principles as defined (ISO, 2009) stipulate the need to be dynamic, iterative and responsive yet in the same breath define the risk management processes as being planned, systematic and methodical. This may imply that the principles of diversity, iteration and change are overshadowed by the systematic, structured and timely approach to be applied. Managing threats / transformation requires the implementation of risk management principles that inform continuous alignment (and realignment) with organisational operations and processes and embed this behaviour in risk management practices (Teece, 2007).

Table 4.14 (below) presents the summary of findings from question 8, mapping the findings to the research sub-question and topic area. This table is presented to provide a clear view of the findings per topic area of the research.

Table 4-14: Summary of findings for question 8

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
Risk management principles	SQ2	8	Risk management principles to be adopted	• Risk management is systematic, planned and structured and a principles adopted by organisations thus impacting on flexibility, adaptability and the ability to respond to change. • Risk management principles to be adopted: ▪ Value creation ▪ Embedded in business ▪ Integral part of business processes ▪ Decision making tool ▪ Diversity in skills and expertise (across specialities) ▪ Internal and external environment alignment ▪ Tailored for business areas ▪ Business facilitation ▪ Inclusive of business ▪ Transparency
Risk management principles	SQ2	8	Risk management principles to be adopted for a	Risk management principles to be further considered for a changing environment is:

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
			changing environment	- Continuous risk management education and learning - Risk management that is fit for purpose - Agility - Continuous communication - Hands-on risk management - Transparency - Futuristic risk assessment - Flexibility of risk management frameworks - Alignment with organisation or business unit culture

4.4.3. Topic Area – Risk Management Process

To determine the existing risk management processes as well as the current challenges, question 9 and 10 was asked as part of the online questionnaire (Refer to APPENDIX: A2 – Section 5: Question 9 and 10).

From the responses received from the research participants it was indicated that both business and risk are responsible for the planning of risk as well as the implementation of desired controls within business. The challenges highlighted were: the lack of collaboration, risk assessments being a separate process to business activities, the risk fraternity being removed from what business does as well as time constraints when conducting risk assessments. The risk management process should be an integral part of management and decision making, integrated into the structure, operations and processes of the organisation (Nair et al., 2013).

Table 4.15 and table 4.16 (below) presents the summary of findings from question 9, mapping the findings to the research sub-question and topic area. This table is presented to provide a clear view of the findings per topic area of the research.

Table 4-15: Summary of findings for Risk Management Process topic areas – question 9

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
Risk management processes	SQ3	9	Existing risk management processes	What was noted was that little brainstorming is held by risk with business which speaks to the factor of engagement between risk and business. Risk management processes should ensure that: • Business and the risk fraternity are responsible for the planning of contingency • Ensuring customer needs by the early and continuous identification and resolution of risks • Business and risk being equally responsible for the implementation of controls • Continuous communication and consultation with business • Risk velocity to be considered as a risk measure • Risk and business are responsible for monitoring and reviewing risks

Table 4-16: Summary of findings for Risk Management Process topic areas – question 9

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
Risk assessment challenges	SQ3	10	Existing / current risk management challenges	• Relevance to business focus • Risk skills and knowledge • Risk assessment process removed from business as usual processes • Inconsistent communication • Adequate business engagement • The divide between

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
				business and risk
				• Time constraints
				• Lack of collaboration with business
				• Risk assessments done late
				• No clever scope and objectives
				• Risk visibility
				• Late reporting
				• Negative risk culture
				• Retrospective risk management
				• Not assessing future impact
				• Risk assessment not part of business practices and culture
				• Risk ownership
				• Lack of business buy-in and involvement
				• Limited business understanding
				• Business commitment to implement controls
				• Tick-box exercise (compliance and governance exercise)
				• Complexity of risk assessment methodology
				• Non adaptable risk frameworks and practices
				• Lack of accountability
				• Lack of business co-operation

4.4.4. Topic Area –Dynamic Risk Management

In order to gain an understanding of or perspective on what the respondents defined as dynamic risk management as well as to sense the benefits they would associate with a dynamic risk framework questions 11-14 were asked as part of the online questionnaire (Refer to APPENDIX: A2 – Section 6: Questions 11-14).

From the responses received dynamic risk management was described as having continuous engagement with business and key stakeholders but also being responsive to change. This therefore makes it imperative for organisations to develop and maintain mechanisms that will allow them to be more responsive yet be in a position to proactively and timeously identify

risks that may impact on the organisation's goals. Nair (2013) states that in order for an organisation to make the most of risk management efforts and to benefit from this practice, responsive organisations need to ensure that their risk management practice has well defined sensing capabilities that will allow the organisation to identify, analyze and measure risks as well as identify emerging opportunities.

The benefits highlighted by the respondents in the survey were: being a business facilitator, being responsive to change and assisting business in identifying risks and opportunities which enables business to handle issues quicker thus supporting the decision making process of business. The dynamic capabilities approach provides a framework which highlights organisational and strategic competences that can be used by the organisation to create competitive positioning that can be developed into a long term competitive advantage (Teece, 2007) .The dynamic capabilities section is separated into three main components of capabilities; namely, (1) to sense and shape opportunities and threats, (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise's intangible and tangible assets(Teece, 2007). With that said the respondents indicated that the risk management process in a dynamic environment should consider factors such as: risks should be reported as when they are identified, the practices should be transformable so as to cater for changing organisations, and dynamic risk management should be iterative and responsive to change. Dynamic risk management described by respondents in their words included:

- Flexibility to act immediately;
- Accountability; and
- Different dynamic risk approaches for different operations;
- Embedding risk within business;
- Business and risk working more closely; and
- Inclusiveness of different expertise and continuous focus on gaining an understanding of business as it changes.

These factors are aligned to the dynamic risk management capabilities of sensing, seizing, managing and transforming required for the implementation of a dynamic risk management framework.

Table 4-17: Summary of findings for Risk Management Process topic areas – questions 11

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
Dynamic risk management described	SQ3	11	Respondent's perspective of what dynamic risk management is.	• Dynamic risk management was stated as not being a once-off and systematic process but defined as: • Continuous engagement • Collaboration with business • Responsive to change • Embedded within business • Existing of diverse skills and expertise • Tailored for business • 'value-based prioritisation of risk efforts • Iterative process

Table 4-18: Summary of findings for Risk Management Process topic areas – questions 12

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
Benefits of dynamic risk management	SQ3	12	The respondents view on what the benefits of adopting a dynamic risk management process	• More responsive • Quicker identification and resolution of risks • Value adding • Partnering with business • Embedded in business • Limit financial loss and poor decision making • Unified risk management approach • Timeous reporting • Aligned with business environment • Proactive risk management • Business efficiency • Increased agility • Risk maturity • Trust and open communication between business and risk • Early detection and rapid resolution of risks • Risk prioritisation • Adaptability • Increased predictability of risks

Table 4-19: Summary of findings for Risk Management Process topic areas – questions 13

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
Dynamic risk management principles	SQ3	13	Gain a view of what would be considered as key dynamic risk management principles	• Real-time risk management • Responsive to change • Iterative process • Aligned to key performance indicator

Table 4-20: Summary of findings for Risk Management Process topic areas – questions 14

Topic Area	Sub-Question	Survey question #	Survey Question Objective	Summary of findings
Transformation to dynamic risk management	SQ3	14	Transformation required for dynamic risk management	• Embedding risk within business • Inclusiveness of different skills and expertise

4.5. Conclusion

The purpose of this chapter was to discuss the data from the survey pilot as well as the online questionnaire based on the research strategy described in previous chapters. The first part of this chapter looked at the application of the research design chosen and provided a view of the data collection methods linked to the research questions.

The second part of the chapter discussed the survey pilot in terms of how the pilot was conducted so as to ensure the survey ease of use. In addition to that, it shows how the feedback received from online questionnaire pilot participants was then used to enhance the online questionnaire.

The third part of the chapter discussed the online questionnaire, looking at the research participant's selection, data collection and data analysis. For the data analysis section findings

were presented in themes; namely, respondent consent, respondent profile, risk management framework, risk management principles, existing risk management process and challenges, and dynamic risk management described and perceived benefits. The results of the findings were presented and summarised per topic area.

Chapter 5: Integration of Findings

This section focuses on the integration of research findings, looking at risk management in dynamic environments extracted from literature as well as the online questionnaire.

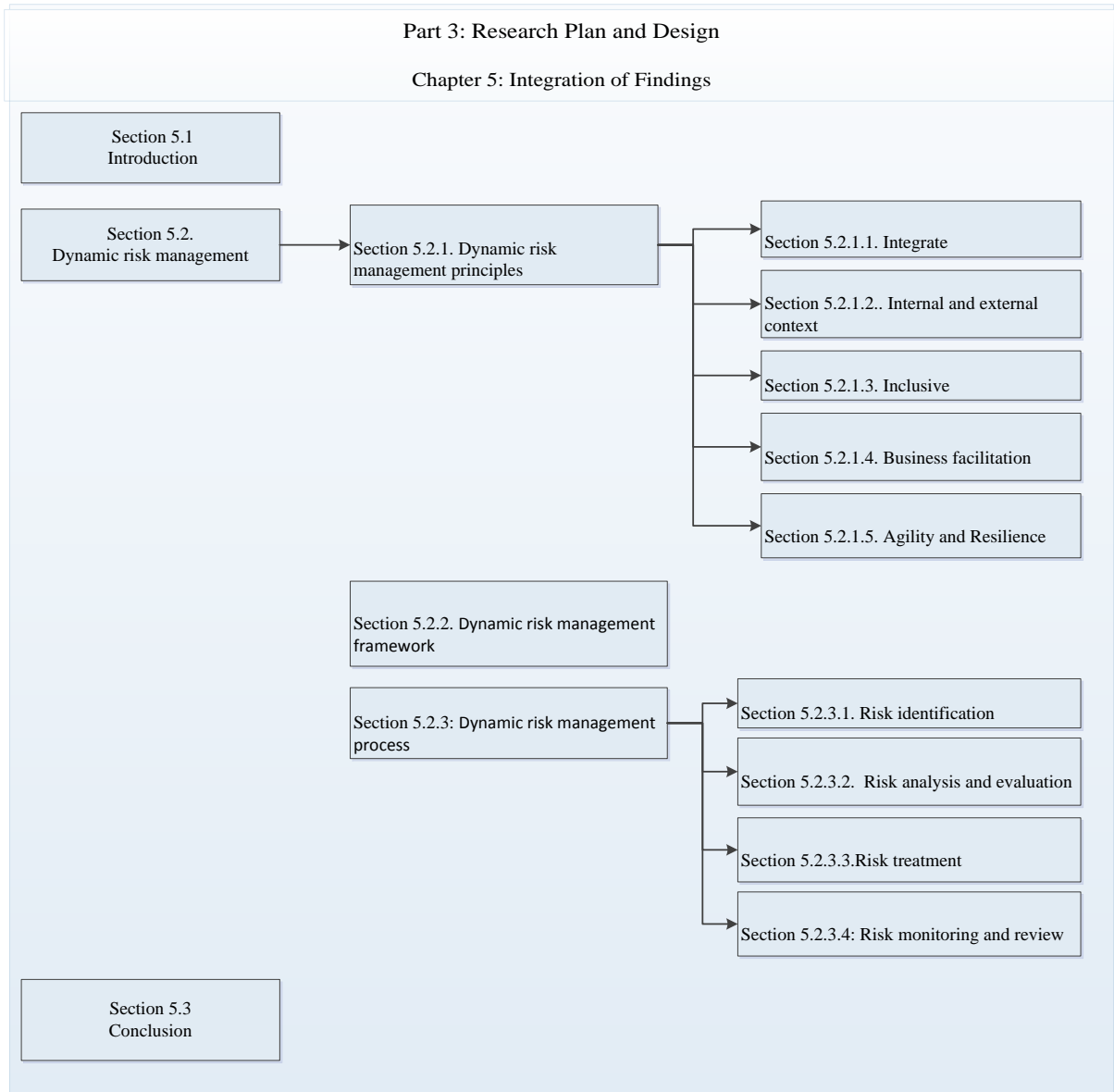Figure 5-1: Overview of chapter 5

5.1. Introduction

Risk management forms part of a vital decision making process (ISO, 2009) that may contribute to an organisation experiencing exceptional growth. The challenge now faced by the risk community is how to conduct risk management in dynamic environments, because organisations that are now emerging are more responsive to change and have adopted

organisational systems that are more non-linear. This allows them to be more flexible, innovative, integrated and able to respond to change quickly.

Risk management as a function faces a challenge of being planned, systematic and methodical and not being able to satisfy the need of an organisation that may be operating in a dynamic environment. Teece (2007) defines dynamic capabilities as the ability of an organisation to respond to changes and reconfigure itself by sensing its internal and external environment, being able to seize through the exploitation of opportunities as well as the ability to manage and transform to meet changes. By using the dynamic capabilities framework, risk communities in organisations will be to meet the risk management demand of organisations existing in dynamic environments (Nair et al., 2013). Furthermore, they will be able to align the risk management framework to the dynamic capabilities and identify agility attributes that may allow risk management to respond to the changing needs of the organisation. Through the identification, exploitation and management of threats and opportunities, the dynamic risk management framework can be used as a key tool in decision making if aligned to the organisation strategy and objectives.

5.2. Dynamic Risk Management

5.2.1. Dynamic Risk Management principles

The purpose of dynamic risk management is to ensure that organisations are able to develop and maintain mechanisms that will allow them to be more responsive yet be in a position to proactively and timeously identify risks that may impact on the organisation's goals. The principles outlined in Figure 5-2 provide guidance on the characteristics of effective and efficient risk management, having the capability to direct and/or redeploy risk mechanisms and resources, effectively responding to the impact that the risk (threat or opportunity) may have. In Figure 5-2 a graphical representation of dynamic risk management principles is presented, derived from the online questionnaire and interview results. The dynamic risk management principles identified in the survey data were stated as (refer to section 4.4.2)

- Value creation;
- Embedded in business;
- Integral part of business processes;

- Decision making tool;

- Diversity in skills and expertise (across specialities);

- Internal and external environment alignment;

- Tailored for business areas;

- Business facilitation;

- Inclusive of business; and

- Transparency.

Through the analysis of data, the four principles: *internal and external context*, *inclusive*, *integrate* and *business facilitation* presented in figure 5-2 were defined as the core principles that enable agility and resilience within risk management practices. Each principle is discussed in detail and is explained as follows.

Figure 5-2: Dynamic Risk Management Principles

5.2.1.1. Integrate

From the data collected, it was evident that one of the key principles to be adopted when aiming for a risk function that is more flexible, adaptive and responsive to change was integration. This implies the necessity for integration of risk management into all

organisational activities and structures. As per the survey results and literature study, this entails and is not limited to:

- Integration of risk management in the business structures, therefore allowing risk to be embedded within business;

- Reinforcing the integration of risk management in the organisation's culture, operations, programme and project activities;

- Integrating risk management in core business processes and decision making activities and platforms; and

- Integrating risk in all the business governance structures, creating visibility and creating a platform for decision making that is also informed by risk.

In further support of integration, the challenges raised by the respondents in their own words were:

Quote 1 – "Risk is removed from what the business is focused on because they do not do what business is doing."

Quote 2 - "The risk assessment is done as some separate process to business as usual and managers don't think about it to the extent that they should as a result it becomes a tick box exercise at the point it is done. It is rarely part of the decision making process in every business unit."

Quote 3 – "Risks are the only people that know what they are doing. Risk always comes when we are done with projects and raise issues with no solutions."

Quote 4 – "Limited understanding of the business by the risk team when they are not part of the business or close to the business."

Quote 5 – "There needs to be more involvement of Risk Management in all operational meetings between business and relevant stakeholders. Risk Management therefore needs to be imbedded in business. By doing that, we can ensure more effective risk management through developing a more efficient risk culture."

Therefore an integrated risk management function allows the risk function to be closer to the business which supports the effective and efficient identification, assessment, monitoring and reporting of risks.

5.2.1.2. Internal and External Context

In the data collected and through literature study the understanding of the organisational environment both internal and external was identified and key to successful risk management. Gaining an understanding of the environment or obtaining context about the environment when assessing risk is one of the first important steps of the risk assessment process. Therefore considering the dynamic environment in which organisations now operate in, understanding the internal and external context of the organisation is now more than ever a key principle if effective risk management is to be applied. Based on the data collected, understanding the internal and external environment of an organisation is key to effective dynamic risk management. Why this is important is because of the effective identification of current and emerging risks so as to adequately support business in the mitigation of these risks through the implementation of relevant controls fitting the organisational context. In addition to that the purpose, goals, objective and complexity of organisations differ based on the organisation's structure, operations and processes. Hence risk management can be proportionate to the level of risk faced by the organisation

When designing a dynamic risk management framework, the organisation should first consider the nature and complexity of the organisation as well as the environment in which it operates therefore an understanding of both the internal and external context of the organisation is vital.

Based on literature and on the data the internal environment of an organisation would therefore include but is not limited to:

- Vision, mission and values;
- Strategy (long term and short term) and objectives;
- Internal governance structures;
- Organisational structure, roles and responsibilities;
- Organisational culture;
- Financial performance;
- Technology landscape and dependencies;
- Information flow and data requirements;
- Contractual obligations and commitments;
- Policies, standards and procedures; and
- Models adopted by the organisation.

The external environment of an organisation may include but is not limited to:

- Political landscape;

- Regulatory obligations;

- Legal requirements;

- Economic outlook;

- Environmental factors;

- Emerging disruptive technologies;

- Third party landscape as well as current and future requirements /needs.

- Internal influences; and

- Key drivers and trends which affect the organisation's objectives.

Understanding the internal and external context also allows risk practitioners to be more proactive and predicative in their risk function, being able to identify leading key risk indicators that would allow for forecasting.

5.2.1.3. Inclusive

Inclusive risk management is the appropriate and timely involvement of all stakeholders (business, risk, partners, third parties etc.) to enable effective knowledge management thus encouraging learning, knowledge transfer, transparency and accountability. In addition to that it allows for all knowledge, views and perceptions to be considered and shared by all stakeholders. It encompasses:

- Inclusive processes of sensing, seizing and management of risks by business and the risk fraternity;

- Reconfiguration and redirection of strategy, objectives, structure, resources, skills, expertise, knowledge as well as governance structures that are inclusive of both the organisations and the risk fraternity;

- Business and risk partnering to remediate of risks; and

- Business and risk developing controls to mitigate risks;

- Governance structures that are presented by both business and risk;

- Risk resources and capabilities acquired and developed in terms of the organisation's needs;

- Diversity of risk resources and skills in alignment with the organisation's current and future needs;

In further support of inclusiveness, the challenges raised by the respondents in their own words were:

Quote1: "Big divide between risk and business. Not always working as partners."

Quote 2: "lack of accountability."

Quote 3: "Lack of collaboration."

Quote 4: "Not having adequate information."

The principle of inclusiveness encourages continuous alignment, knowledge sharing, accountability as well as the level of transparency within an organisation. This also presents the step towards risk being able to identify opportunities and not just threats because they have a better sense of involvement and access to all stakeholders of the organisation since they are concerned about business performance and sustainability.

5.2.1.4. Business Facilitation

From the data collected one of the main concerns raised by the respondents was the value of risk management and the impact that it has on the organisation. In comments received from the respondents, risk management was referred to as a tick box exercise with little or no value to the organisation in terms of where they are and where they were going. Business facilitation, identified as one of the key principles of dynamic risk management, is the improvement and development of effective policies, standards, procedures and tools that will allow for sustainability as well as the reconfiguration / transformation of the organisation. From the data collected, one of the research participants stated:

Quote: 'Business still regards risk assessment as a red tape activity and does not see it as a pro-active activity to manage one's risks"

This therefore suggests that the value of risk management is still not seen and for that reason business requires risk to be more of a business facilitation function that can truly assist in decision making processes.

5.2.1.5. Agility and Resilience

The set of risk management principles defined in figure 5-2 are the foundation of a successful and effective risk management approach and in order for an organisation to understand the

characteristics of risk management and what it is to deliver on, risk management practices would then operate on these sets of principles. The risk management principles defined are essential features of dynamic risk management and describe what risk management should be in practice, as depicted in Table 5-1. What is also included in the center of figure 5-2 is agility and resilience and that is what risk management should do or deliver on as shown in Table 5-1.

In this dynamic risk management framework, it is therefore useful to distinguish between i) the characteristics of risk management and ii) what it should be delivering on when adopting and developing a risk management framework (Hopkin, 2012), depicted in table 5-1.

Table 5-1: Characteristics and delivery of risk management

Characteristics of risk management based on dynamic risk management principle	Delivery of risk management
Business Facilitation: improvement and development of effective policies, standards, procedures, aligned with business strategy and objectives	Agility and Resilience: Provide assurance regarding the management of significant risks considering the business strategy and objectives and the exploitation of opportunities
Inclusiveness: Risk management should be involved in all engage with all stakeholders	Agility: Timely and appropriate involvement so as to effective risk identification , assessment and monitoring
Integrated: Integration of risk management into all organisational activities and structures.	Resilience: Consider risk impact on decision made across the organisation
Internal and External Context: Risk management activities must be dynamic and responsive to emerging and changing risk that may exist as of the result of the internal and external context of the organisation	Resilience and Agility: Dynamic, iterative and responsive to change considering the internal and external context of the organisation.

These principles are the foundation for dynamic risk management and should be considered when establishing the organisation's dynamic risk management framework and processes. These components might already exist in full or in part within an organisation, however, they might need to be adapted or improved so that managing risk is efficient, effective and consistent. In addition to that the way in which businesses operate and respond to change is dependent on their dynamic capabilities (Teece et al., 2016) so the inclusion of the dynamic capabilities in relation to the organisational agility attributes defined by (Ganguly et al., 2009) is fundamental to how risk can be managed in an organisation.

5.2.2. Dynamic Risk Management Framework

For effective dynamic risk management, the risk management fraternity and organisations are required to realize the impact that fast-moving business environments, global competition and competitive advantage have on the organisation's ability to meet business objectives. Based on the literature study, organisational agility is characterized by the following agility attributes:

- Responsiveness;
- Speed;
- Ability to meet customer needs; and
- Flexibility.

While most of these definitions of agility cover the essential characteristics: time, flexibility of the system and responsiveness, the definitions by Yusuf et al. (1999) and Dove (1999, 2001) take into account all the essential characteristics of agility. Yusuf (1999) defined agility as the successful exploration of once-competitive bases (speed, flexibility, innovation proactivity, quality, and profitability) through the integration of resources and best practices so as to provide customer-driven products and services in a dynamic environment. Considering literature and data received these are defined as agility attributes. With this in mind, both the risk function and the organisation need to demonstrate timely responsiveness, speedy and appropriate deployment and redirection of resources and mechanisms, effective management of customer needs and capability and flexible product innovation and organisation reconfiguration. This therefore emphasizes that the risk management fraternity should develop dynamic capabilities (sense, seize, manage and transform) that will allow them to respond to changing needs.

For the development of the dynamic capabilities framework, as depicted in figure 5-3, the dynamic capabilities *sense, seize, manage and transform* were aligned with the organisational agility attributes *speed, flexibility, responsiveness and customer need*. In the context of organisational agility, the ability of organisations to meet customer needs was defined as agility attributes hence the inclusion in the framework.

In figure 5-3 the dynamic capabilities and agility attributes are at first presented separately from the dynamic risk management principles so as to illustrate the alignment.
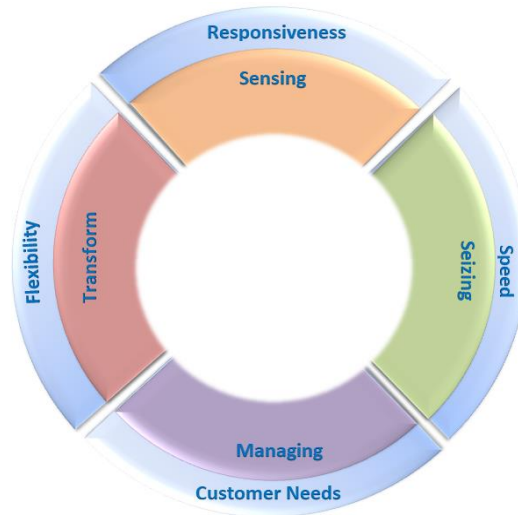
Figure 5-3: Alignment of the dynamic capabilities and organisational agility attributes

The rationale for aligning the specific dynamic capabilities and agility attribute is expanded on here:

- *Sensing* is defined by Teece (2007) as the ability to identify and shape opportunities by constantly scanning, searching and exploring, signifying that a level of responsiveness to events and developments is required if complete agility is required in a dynamic environment. Sensing and responsiveness can be applied at different levels i.e. high sensing capabilities and low responsiveness

- *Seizing* is defined by Teece (2007) as exploitation of opportunities that have been sensed. To meet the demand of change, the speed at which one exploits these opportunities is important. As a result, speed and seize were aligned within the framework.

- *Manage threat* is defined as sustaining profitable growth and considering customer needs as an agility attribute and looks at continuous delivering on demands by using required resources. Meeting customer needs and manage threat were aligned with the consideration of sustainability.

- *Transform* is defined by Teece (2007) as maintaining evolutionary fitness, being able to reconfigure if necessary. Flexibility as an agility attribute was aligned with transform as they both refer to the ability to reconstruct or change.

In summary the ability to conduct effective risk management agility and resilience requires for effective dynamic risk management whereby the risk management fraternity and organisations are required to realize the impact that fast-moving business environments,

global competition and competitive advantage have on the organisation's ability to meet their business objectives. Risk and the organisations need to demonstrate timely responsiveness, speedy and appropriate deployment and redirection of resources and mechanisms, effective management of customer needs and flexible product innovation and organisation reconfiguration. This therefore emphasizes that the risk management fraternity should develop dynamic capabilities so as to enable the organisation to sense, seize and manage: firstly the shifting of the environment in which the organisation operates, and secondly, the transformation of the organisation's internal and external organisational skills, resources, and functional competencies toward the changing environment.

Risk management therefore plays an important role in enabling the organisation to appropriately adapt, integrate, and re-configure itself within the environment in which it operates. Therefore dynamic capabilities aligned to organisational agility attributes can be used in developing a dynamic risk management framework that will assist an organisation in conducting risk management within dynamic environments. Figure 5-4 illustrates the alignment of the dynamic capabilities and agility attributes with the risk management principles thus presenting the first version of the dynamic risk management framework.
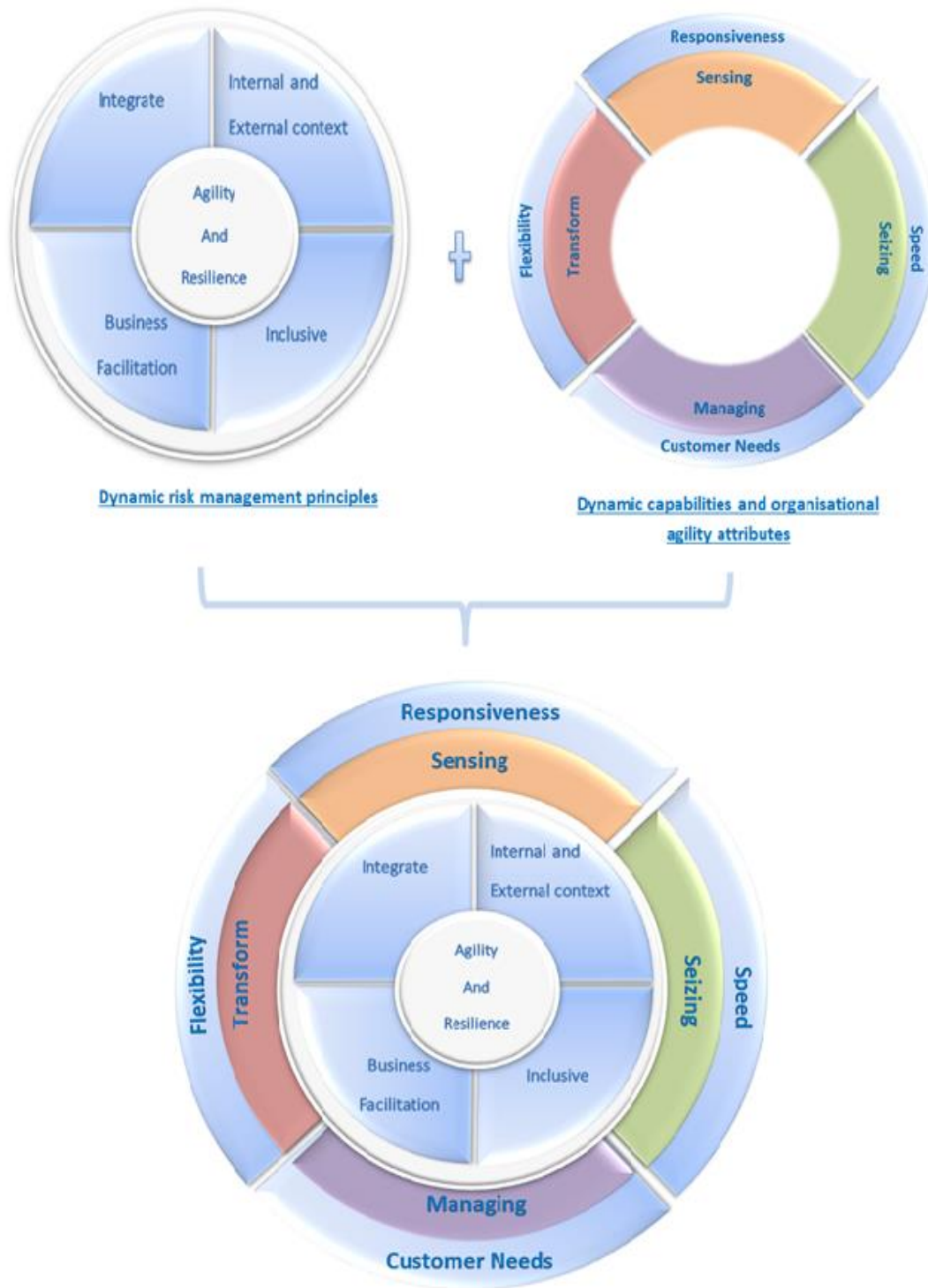
Figure 5-4: The alignment dynamic capabilities and agility attributes, producing the Dynamic Risk Management Framework (version 1).

5.2.3 Dynamic Risk Assessment Process

The risk assessment process entails:

- Identification of risks. This step involves identifying what can go wrong as well as the impact (consequence) the risk may have;

- Analysis and evaluation of risk, the risk analysis and evaluation step involves analysing the impact and likelihood of a risk. It involves comparing the level of risk for acceptance, treatment or monitoring;

- Risk treatment. This involves identifying the range of options for treating the risk, evaluating options, preparing the risk treatment plans and implementing those plans. It is about considering the options for treatment and selecting the most appropriate method to achieve the desired outcome; and

- Monitoring and review. This is an ongoing part of risk management. The purpose of monitoring and review is to improve and or ensure that processes are adequately designed, implemented as intended and that the process delivers on the intended outcomes. Monitoring and review includes planning, gathering and analysing information, recording results and providing feedback. The results of the monitoring and review should therefore be incorporated throughout the risk management process.

In developing the dynamic risk management framework, the risk assessment process is looked at because this research aims to develop a dynamic risk management framework and principles that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment. It considers the complexity of the environment in which organisations may be operating.

5.2.3.1. Risk Identification

Sensing / Responsiveness have been aligned with risk identification because, in order to adequately identify risks within a dynamic environment, organisations must be able to scan, search and explore their environments and pose responsive agility attributes so as to adequately respond to what has been identified, figure 5-5. The combination of sensing and responsiveness therefore influences the ability to recognize and describe risks that may assist

in and/or prevent business from achieving their business objectives. This is further discussed in Table 5-2.
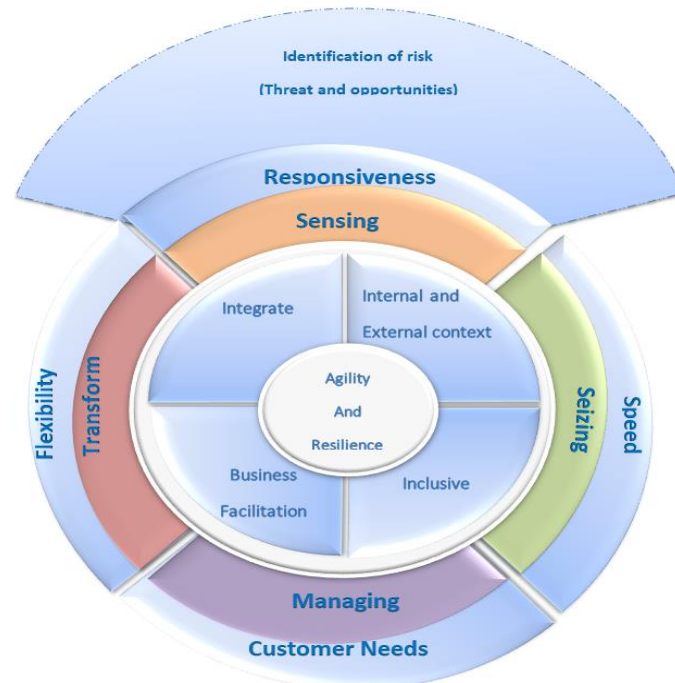

Figure 5-5: Dynamic risk identification framework

Based on both data and literature the combination of sensing and responsiveness is looked at in a quadrant, where each quadrant reflects the level of either sensing or responsiveness. This level is represented as high or low thus resulting in four scale ranges:

- High sensing capabilities / high responding agility attributes;
- High sensing capabilities / low responding agility attributes;
- Low sensing capabilities / high responding agility attributes; and
- Low sensing capabilities / low responding agility attributes.

With *high sensing capabilities / high responding agility attributes* being the highest range and illustrated with the colour green in the quadrant and *Low sensing capabilities / low responding agility attributes* the lowest and illustrated by the colour red. *High sensing capabilities / low responding agility attributes* and *Low sensing capabilities / high responding agility attributes* are amber as they are in the middle range.

Based on the data collected and the literature study characteristics for enabling sensing, factors influencing responsiveness were defined and mapped to a quadrant with Quadrant 1 being the ideal state and Quadrant 4 the least desired state.

Table 5-2: Risk Identification

Quadrant 3 *Low sensing capabilities / high responding agility attributes* Risk Functions and organisations in this quadrant do not have the capabilities to effectively identify, recognise and describe risks but do have the agility attributes to respond in a manner that would be quick. **Characteristics enabling sensing:** Lack of risk resource and skills, lack of skills development programme, non-diverse teams, biases by organisation or risk function, negative and non-inclusive risk culture, lack of risk systems **Factors influencing response:** Risk embeddedness in business, risk inclusiveness in project and programme activities, risk understanding of organisational threats / vulnerabilities, risk reporting aligned to key performance indicators and key business drivers	**Quadrant 1** *High sensing capabilities / high responding agility attributes* Risk Functions and organisations in this quadrant have the capabilities to effectively identify, recognise, describe and respond to risks. **Characteristics enabling sensing:** Well-developed capabilities in risk management, diversity in skills within risk, effective risk resource utilisation skills, adopted and used risks systems, positive and inclusive risk culture, end –to-end risk function incorporating legal, risk and compliance **Factors influencing response:** Risk embeddedness in business, risk inclusiveness in project and programme activities, risk understanding of organisational threats / vulnerabilities, risk reporting aligned to key performance indicators and key business drivers
Quadrant 4 *Low sensing capabilities / low responding agility attributes* Risk Functions and organisations in this quadrant do not have the capabilities to effectively identify, recognise and describe risks hence they fail to timely respond to risks if at all. **Characteristics enabling sensing:** Lack of risk resource and skills, lack of skills development programme, non-diverse teams, biases by organisation or risk function, negative and non-inclusive risk culture, lack of risk systems **Factors influencing response:** Centralised risk function, delayed or late involvement in project and programme activities, risk not fully understanding the organisation's threat landscape, risk reporting based on risk best practice standards only, unnecessary bureaucracy, too specialised roles, non-integrated risk processes and programmes	**Quadrant 2** *High sensing capabilities / low responding agility attributes* Risk Functions and organisations in this quadrant have the capabilities to effectively identify, recognise and describe risks but fail to timely respond to risks. **Characteristics enabling sensing:** Well-developed capabilities in risk management, diversity in skills within risk, effective risk resource utilisation skills, adopted and used risks systems, positive and inclusive risk culture, end –to-end risk function incorporating legal, risk and compliance **Factors influencing response:** Centralised risk function, delayed or late involvement in project and programme activities, risk not fully understanding the organisation's threat landscape, risk reporting based on risk best practice standards only, unnecessary bureaucracy, too specialised roles, non-integrated risk processes and programmes

Responding (vertical axis label)

Sensing (horizontal axis label)

5.2.3.2. Risk Analysis and Evaluation

Seizing/Speed have been aligned with risk analysis and evaluation because, in order to adequately analyse the impact and likelihood of a risk and evaluate the level of risk for acceptance, treatment or monitoring, organisations must be able to timeously exploit opportunities that have been sensed or mitigate possible threats. The combination of *seize* and *speed* therefore influences the ability to mitigate risks timeously and exploit the right opportunities, figure 5-6. This is further discussed in Table 5-3.

Seizing dynamic capabilities and speed agility attributes has an impact on the risk analysis and evaluation. The combination of *seize* and *speed* therefore influences the ability to comprehend the nature of the risk, its causes and consequences. In addition to that it hinders the actions taken to mitigate the risks which include speed of response or risk velocity, figure 5-6. Therefore organisations and risk must understand their capability set so as to foster effective risk management.
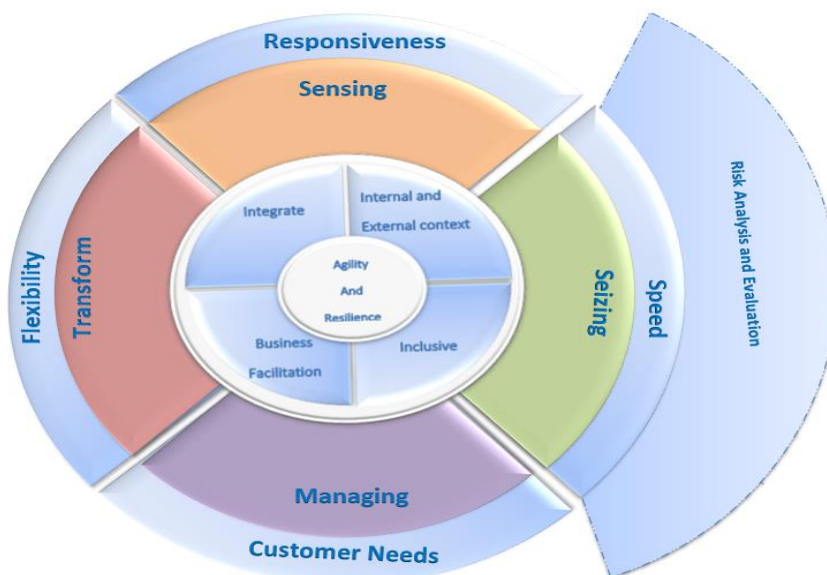

Figure 5-6: Dynamic risk analysis and evaluation framework

Based on both data and literature the combination of *sensing* and *responsiveness* are looked at in a quadrant, where each quadrant represents the level of either sensing or responsiveness. This level is represented as high or low thus resulting in four scales ranges these being:

- High seize capabilities / high speed agility attributes;
- High seize capabilities / low speed agility attributes;
- Low seize capabilities / high speed agility attributes; and
- Low seize capabilities / low speed agility attributes.

With *high seizing capabilities / high speed agility attributes* being the highest range and illustrated with the colour green in the quadrant and *Low seizing capabilities / low speed agility attributes* the lowest and illustrated by the colour red. *High seizing capabilities / low speed agility attributes* and *Low seizing capabilities / high speed agility attributes* are amber as they are in the middle range and an indicating that either the capabilities or agility attributes are within the desired levels.

Based on the data collected and the literature study characteristics for enabling seizing and factors influencing speed were defined and mapped to a quadrant, Quadrant 1 being the ideal state and Quadrant 4 the least desired state.

Table 5-3: Risk evaluation and analysis

Quadrant 3 *Low seizing capabilities / high speed agility attributes* Risk Functions and organisations in this quadrant do not have the capabilities to effectively identify, recognise and describe risks but do have the agility attributes to respond in a manner that would be quick. **Characteristics enabling seizing:** Divergence of opinions and biases, lack of quality information/ data, limitation in risk techniques to be used, unavailability of resources **Factors influencing speed:** Well defined risk and control matrix, three dimensional risk measures considering impact, likelihood and velocity, effective decision making processes	Quadrant 1 *High seizing capabilities / high speed agility attributes* Risk Functions and organisations in this quadrant have the capabilities to comprehend the nature of the risk, its cause and consequence and deploy the appropriate resources as well as speedily respond to the impact possibly introduced by the risk. **Characteristics enabling seizing:** Well-developed, defined and implemented risk measures, the use of both qualitative and quantitative risk analysis techniques, availability and reliability of information/data, risk resource availability, well defined and implemented risk processes and procedures, use a combination of risk techniques for greater insight **Factors influencing speed:** Well defined risk and control matrix, three dimensional risk measures considering impact, likelihood and velocity, effective decision making processes
Quadrant 4 *Low seizing capabilities / low speed agility attributes* Risk Functions and organisations in this quadrant do not have the capabilities to comprehend the nature of the risk, its cause and consequence and deploy the appropriate resources as well as speedily respond to the impact possibly introduced by the risk. **Characteristics enabling seizing** Divergence of opinions and biases, lack of quality information/ data, limitation in risk techniques to be used, unavailability of risk resources **Factors influencing speed:** Two dimensional risk measures considering only impact and likelihood with no consideration of risk velocity, ineffective decision making processes, lack of understanding control environment	Quadrant 2 *High seizing capabilities / low speed agility attributes* Risk Functions and organisations in this quadrant have the capabilities to comprehend the nature of the risk, its cause and consequence and deploy the appropriate resources but fail to speedily respond to the impact possibly introduced by the risk. **Characteristics enabling seizing:** Well-developed, defined and implemented risk measures, the use of both qualitative and quantitative risk analysis techniques, availability and reliability of information/data, risk resource availability, well defined and implemented risk processes and procedures, Use a combination of risk techniques for greater insight **Factors influencing speed:** Two dimensional risk measures considering only impact and likelihood with no consideration of risk velocity, ineffective decision making processes

Speed (vertical axis label)

Seizing (horizontal axis label)

5.2.3.3. Risk Treatment

Manage threat / manage customer need has been aligned with risk treatment because both are looked at from a sustainability perspective with the intention of delivering on the demands that have been set. Risk treatment involves identifying the range of options for treating the risk, evaluating options, preparing the risk treatment plans and implementing those plans. It is about considering the options for treatment and selecting the most appropriate method to achieve the desired outcome. In this context the risk to be addressed is that of client risk, considering all options, actions and activities that can be implemented.

The combination of *manage threat* and *manage customer* therefore impacts on the risk treatment plans, table 5-4. The combination of *manage threat* and *manage customer need* therefore influences the ability to facilitate competiveness, profitability, market penetration, value creation and customization. Therefore organisations and risk must understand their capability set so as to foster effective risk management.

Based on both data and literature the combination of *manage customer needs* and *manage threat* are looked at in a quadrant, where each quadrant signifies the level of either *manage threat* or *manage customer needs*. This level is represented as high or low thus resulting in four scales ranges:

- High manage threat capabilities / high manage customer needs agility attributes;
- High manage threat capabilities / low manage customer needs attributes;
- Low manage threat capabilities / high manage customer needs attributes; and
- Low manage threat capabilities / low manage customer needs attributes.

With *high* manage threat *capabilities / high* manage customer needs *agility attributes* being the highest range and illustrated with the colour green in the quadrant and *Low* manage threat *capabilities / low* customer needs *agility attributes* the lowest and illustrated by the colour red. *High* manage threat *capabilities / low* customer needs *agility attributes* and *Low* customer needs *capabilities / high* customer needs *agility attributes* are amber as they are in the middle range.

Based on the data collected and the literature study, characteristics for enabling manage threat and factors influencing manage customer need were defined and mapped to a quadrant, Quadrant 1 being the ideal and Quadrant 4 the least desired state.
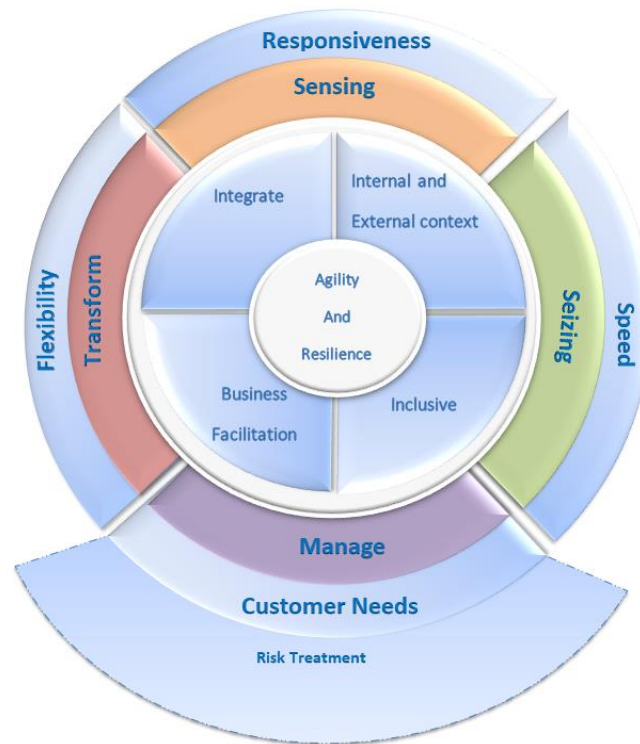
Figure 5-7: Dynamic risk treatment framework

Table 5-4: Risk Treatment

Quadrant 3	Quadrant 1
Low manage capabilities / high customer agility attributes	*High manage capabilities / high customer needs agility attributes*
Risk Functions and organisations in this quadrant do not have the capabilities to manage opportunities and threats to sustain profitable growth but have an understanding of what the customer need needs	Risk Functions and organisations in this quadrant have the capabilities to manage opportunities and threats to sustain profitable growth and meet customer needs.
Characteristics enabling manage: Risk misaligned to strategy, no knowledge management processes or platforms, decentralised risk function, unclear roles and responsibilities in terms of risk identification and remediation, inadequate risk resourcing and contingency planning	**Characteristics enabling manage:** Risk aligned to strategy, effective and advance knowledge management systems, risk activities supporting the protection of intellectual property, risk embedded in business, risk indicators aligned to business performance indicators (KRI vs KPI), risk and business roles and responsibility for risk identification and remediation, adequate risk resourcing including contingency
Factors influencing customer need: Risk and the organisations having one understanding of who their primary customer is	**Factors influencing customer needs:** Risk and the organisations having one understanding of who their primary customer is.
Quadrant 4	Quadrant 2
Low manage capabilities / low customer needs agility attributes	*High manage capabilities / low customer need agility attributes*
Risk Functions and organisations in this quadrant do not have the capabilities to manage opportunities and threats to sustain profitable growth and do not understand customer needs	Risk Functions and organisations in this quadrant have the capabilities to manage opportunities and threats to sustain profitable growth but do not understand customer needs
Characteristics enabling manage: Risk misaligned to strategy, no knowledge management processes or platforms, decentralised risk function, unclear roles and responsibilities in terms of risk identification and remediation, inadequate risk resourcing and contingency planning	**Characteristics enabling manage:** Risk aligned to strategy, effective and advance knowledge management systems, risk activities supporting the protection of intellectual property, risk embedded in business, risk indicators aligned to business performance indicators (KRI vs KPI), risk and business roles and responsibility for risk identification and remediation, adequate risk resourcing including contingency
Factors influencing customer needs: Difference in opinion in terms of who the customer is (internal stakeholders vs man in the street), high need to satisfy internal stakeholders with no consideration of the client, non-independence risk view, lack of business facilitation, blurred lines between risk function and operations	**Factors influencing customer need:** Difference in opinion in terms of who the customer is (internal stakeholders vs man in the street), high need to satisfy internal stakeholders with no consideration of the client, non-independence risk view, lack of business facilitation, blurred lines between risk function and operations

Manage Customer Needs (vertical axis label)

Manage threats

5.2.3.4. Risk Monitoring and Review

Transform / flexibility have been aligned with risk monitoring and review because they are required to be an ongoing part of risk management. The purpose of monitoring and review is to improve and or ensure that processes are adequately designed, implemented as intended and that the process delivers on the intended outcomes. Monitoring and review includes planning, gathering and analysing information, recording results and providing feedback. In the context of risk monitoring and review in a dynamic environment, it is required that this process facilitates change, reconfiguration and realignment, to the organisation as well as the risk management process.

Transform / flexibility attributes have been aligned with monitoring/review risk process, figure 5-8. The combination of *transform* and *flexibility* therefore influences the ability to improve on quality and effectiveness of processes as well as the continuous realignment and reconfiguration of both the organisation and risk function.

Based on both data and literature, the combination of *transform* and *flexibility* are looked at in a quadrant, where each quadrant indicates the level of *transformation* or *flexibility*. This level is represented as high or low thus resulting in four scales ranges:

- High transform capabilities / high flexibility agility attributes;
- High transform capabilities / low flexibility attributes;
- Low transform capabilities / high flexibility attributes; and
- Low transform capabilities / low flexibility attributes.

With *high* transform *capabilities / high* flexibility *agility attributes* being the highest range and illustrated with the colour green in the quadrant and *Low* transform *capabilities / low* flexibility *agility attributes* the lowest and illustrated by the colour red. *High* transform capabilities */ low* flexibility *agility attributes* and *Low* transform *capabilities / high* flexibility *agility attributes* are amber as they are in the middle range and an indicating that either the capabilities or agility attributes are within the desired levels. Based on the data collected and the literature study characteristics for enabling transformation and factors influencing flexibility were defined and mapped to a quadrant, Quadrant 1 being the ideal state and Quadrant 4 the least desired state.
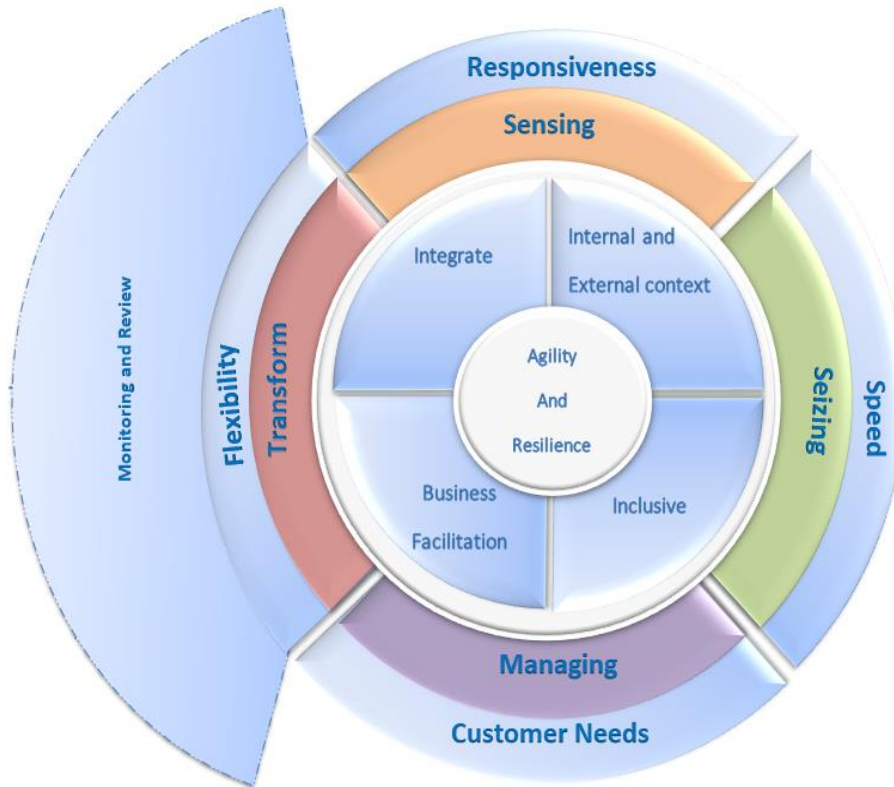
Figure 5-8: Dynamic risk monitoring and review

Table 5-5: Risk Monitoring and review

Quadrant 3 *Low transform capabilities / high flexibility attributes* Risk Functions and organisations in this quadrant do not have the capabilities to continuous realign and improve quality and effectiveness of processes but are able to modify or reconfigure their processes and/or operations **Characteristics enabling transform:** Lack of diverse risk resources and skills, centralised risk functions, no data analytics for trending, systematic and planned risk manage process, mainly managing regulatory obligations, **Factors influencing flexibility:** Able to create new risk processes to provide assurance on highly dynamic business operations i.e. agile software development, iterative risk management process, provide risk information for decision making purposes, real-time risk management in projects, clear, granular and precise risk reporting (risk dashboards),	Quadrant 1 *High transform capabilities / high flexibility agility attributes* Risk Functions and organisations in this quadrant have the capabilities to continuous realign and improve quality and effectiveness of processes and are flexible and able to modify or reconfigure their processes and/or operations **Characteristics enabling transform:** Continuous review and redesign of risk processes to meet organisational needs, ability to restructure the risk function to align to changing organisational structures, diversity in risk skills and expertise matured data analytics for risk trends, integration of risk and business, reporting of emerging risks **Factors influencing flexibility:** Reconfigurable risk resources, create new risk processes to provide assurance on highly dynamic business operations i.e. agile software development, iterative risk management process, provide risk information for decision making purposes, real-time risk management in projects, clear, granular and precise risk reporting (risk dashboards),
Quadrant 4 *Low transform capabilities / low flexibility agility attributes* Risk Functions and organisations in this quadrant do not have the capabilities to continuous realign and improve quality and effectiveness of processes and are unable to modify or reconfigure their processes and/or operations **Characteristics enabling transform:** Lack of diverse risk resources and skills, centralised risk functions, no data analytics for trending, systematic and planned risk manage process, mainly managing regulatory obligations, **Factors influencing flexibility:** Unable to reconfigurable risk resources, structures and operations, inability to provide assurance on highly dynamic business operations i.e. agile software development, systematic and planned risk	Quadrant 2 *High transform capabilities / low flexibility agility attributes* Risk Functions and organisations in this quadrant have the capabilities to continuous realign and improve quality and effectiveness of processes but are unable to modify or reconfigure their processes and/or operations **Characteristics enabling transform:** Continuous review and redesign of risk processes to meet organisational needs, ability to restructure the risk function to align to changing organisational structures, diversity in risk skills and expertise matured data analytics for risk trends **Factors influencing flexibility:** Unable to reconfigurable risk resources, structures and operations, inability to provide assurance on highly dynamic business operations i.e. agile software development, systematic and planned risk management process, risk information for governance and regulatory obligations only

Flexibility (vertical axis label)

Transform (horizontal axis label)

5.3. Conclusion:

Aligning the dynamic capabilities and the agility attributes based on their characteristics and measures allows for the alignment to the risk assessment process. The risk assessment process of risk identification, evaluation & analysis, treatment and monitoring & review is a generic risk assessment that can be used to determine the dynamic capability and agility needed when conducting dynamic risk management.

Figure 5-9 below summarises the Dynamic Risk Management Framework. The inner-most circle of the framework (agility and resilience) defines what risk management is to deliver on when conducting risk management in a dynamic environment. The four quadrants give rise to the dynamic risk management principles and represent the foundation. Risk management practices would then operate on this set of principles. The risk management principles defined are essential features of dynamic risk management and describe what dynamic risk management should be in practice. The outer circle defines the agility attributes and, together with the circle between the outer and inner circle (dynamic capabilities), gives the dynamic risk management process as summarized in figure 5-9.
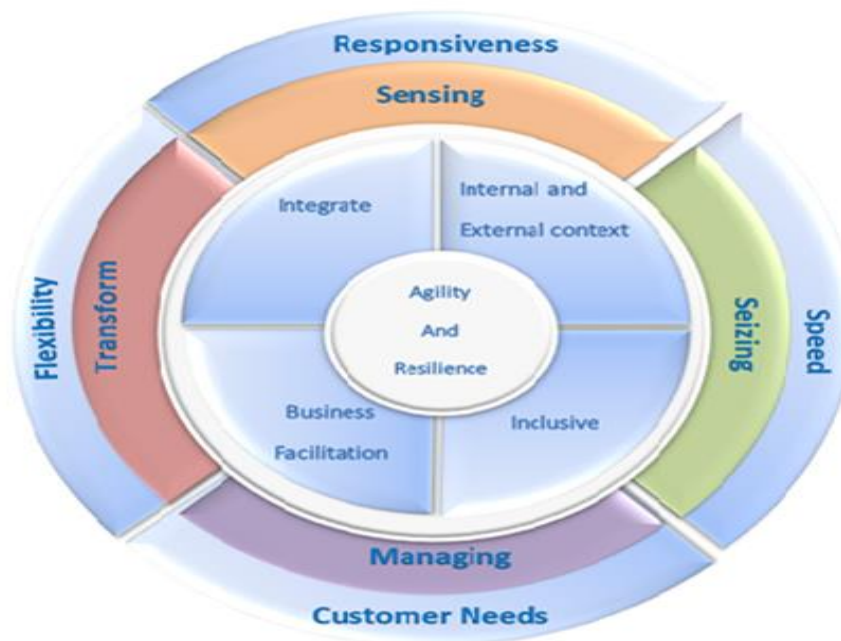

Figure 5-9: Dynamic risk management principles and framework

The risk management process for dynamic risk management is depicted in figure 5-10, defining the characteristics that enable dynamic capabilities as well as the factors influencing the agility required for a dynamic risk management process. The dynamic capability characteristics and agility attributes defined within this process is the ideal states within each phase of the risk management process.
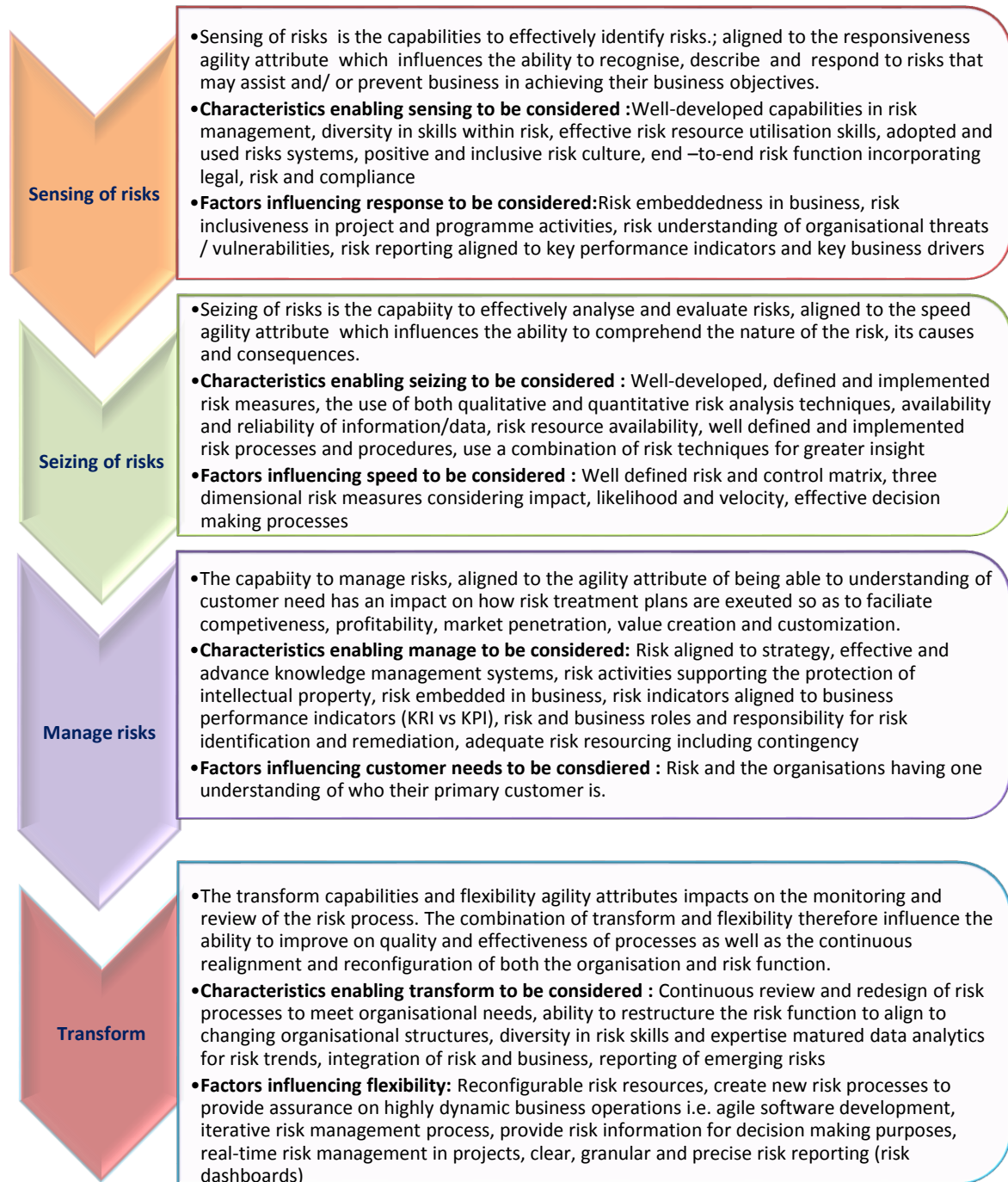

Sensing of risks

- Sensing of risks is the capabilities to effectively identify risks.; aligned to the responsiveness agility attribute which influences the ability to recognise, describe and respond to risks that may assist and/ or prevent business in achieving their business objectives.
- **Characteristics enabling sensing to be considered :**Well-developed capabilities in risk management, diversity in skills within risk, effective risk resource utilisation skills, adopted and used risks systems, positive and inclusive risk culture, end –to-end risk function incorporating legal, risk and compliance
- **Factors influencing response to be considered:**Risk embeddedness in business, risk inclusiveness in project and programme activities, risk understanding of organisational threats / vulnerabilities, risk reporting aligned to key performance indicators and key business drivers

Seizing of risks

- Seizing of risks is the capabiity to effectively analyse and evaluate risks, aligned to the speed agility attribute which influences the ability to comprehend the nature of the risk, its causes and consequences.
- **Characteristics enabling seizing to be considered :** Well-developed, defined and implemented risk measures, the use of both qualitative and quantitative risk analysis techniques, availability and reliability of information/data, risk resource availability, well defined and implemented risk processes and procedures, use a combination of risk techniques for greater insight
- **Factors influencing speed to be considered :** Well defined risk and control matrix, three dimensional risk measures considering impact, likelihood and velocity, effective decision making processes

Manage risks

- The capabiity to manage risks, aligned to the agility attribute of being able to understanding of customer need has an impact on how risk treatment plans are exeuted so as to faciliate competeness, profitability, market penetration, value creation and customization.
- **Characteristics enabling manage to be considered:** Risk aligned to strategy, effective and advance knowledge management systems, risk activities supporting the protection of intellectual property, risk embedded in business, risk indicators aligned to business performance indicators (KRI vs KPI), risk and business roles and responsibility for risk identification and remediation, adequate risk resourcing including contingency
- **Factors influencing customer needs to be consdiered :** Risk and the organisations having one understanding of who their primary customer is.

Transform

- The transform capabilities and flexibility agility attributes impacts on the monitoring and review of the risk process. The combination of transform and flexibility therefore influence the ability to improve on quality and effectiveness of processes as well as the continuous realignment and reconfiguration of both the organisation and risk function.
- **Characteristics enabling transform to be considered :** Continuous review and redesign of risk processes to meet organisational needs, ability to restructure the risk function to align to changing organisational structures, diversity in risk skills and expertise matured data analytics for risk trends, integration of risk and business, reporting of emerging risks
- **Factors influencing flexibility:** Reconfigurable risk resources, create new risk processes to provide assurance on highly dynamic business operations i.e. agile software development, iterative risk management process, provide risk information for decision making purposes, real-time risk management in projects, clear, granular and precise risk reporting (risk dashboards)

Figure 5-10: Dynamic risk management risk process

PART 4: Evaluation

Part 4 of this study consists of chapter 6, which is the proof of concept evaluation and looks at the interview results of the participants and the evaluation that they provided on the dynamic risk management framework.

For the development of the first version of the dynamic risk management framework, the online questionnaire (primary data) and literature review (secondary data) was used. The objective of the online questionnaire was to obtain the professional perspective and facts about the existing risk management principles, framework and process from the participants that were both risk practitioners and business people.

Chapter 6 first provides an overview of the interviews conducted with the research participants and then reports the results of the five in depth interviews conducted for the research. The discussion that came out of these interviews is described and analysed which then led to the improvement of the dynamic risk management framework and principles.

Chapter 6: Evaluation Interview and Revised Framework

Part 4: Evaluation
Chapter 6: Evaluation Interview and Revised framework

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Figure 6-1: Overview of chapter 6

6.1. Introduction

In order to evaluate the first version of the framework, semi-structured interviews were held with a selected group of participants who were selected based on the level of seniority and the organisational type of which they were a part. The interview consisted of three questions namely: 1) What would you define as dynamic risk management principles? 2) How would you apply the dynamic risk management principles, framework and process? 3): What gaps have you identify in the dynamic risk management principles, framework and process.

6.2. Interview Participant Selection

The approach followed for the interviews was the face-to-face interview. Five interview participants were selected based on their job level and experience, these being:

- Group Chief Risk Officer of a traditional organisation;
- The Managing partner of Global Investments (exponential organisations);
- The Group Strategist of a traditional organisation that has adopted agile ways of work within their IT division;
- The Head of Operational risk within financial services that is traditional by nature but had adopted an agile software development approach and have scaled Agile across parts of the organisation; and
- The CEO of an agile company.

The interview participants were selected based on the rationale provided for in table 6-1

Table 6-1: Main criteria and rational for the selection of interview participants

No	Main Criteria (MC)	Rationale
1.	**MC1 (Risk Practitioner)** Risk practitioners, currently employed in a traditional, agile, virtual and exponential organisation.	To obtain a view of issues and benefits of the existing risk management frameworks, principles and practices.
		To gain an understanding of the most utilised and familiar risk frameworks.
		Gain a perspective on how dynamic risk management can be conducted considering organisational structures.
2.	**MC2 (Risk Engagement)** Professionals working in a	View of issues and benefits of the existing risk management frameworks, principles and practices.

		Understanding of the most utilised and familiar risk frameworks
	business area or unit that engages with the risk fraternity and who know risk frameworks;	Perceptive on how dynamic risk management can be conducted considering organisational structures.
3.	**MC3 (Risk Knowledge)** Broad understanding of risk management frameworks	Understanding of the most utilised and familiar risk frameworks
		Perceptive on how dynamic risk management can be conducted considering organisational structures.
4.	**MC4 (Risk Skills and Expertise)** Years working within a risk area or division	View on how dynamic risk management can be conducted considering organisational structures.
5.	**MC5 (Risk management relevance)** Interest and participation in other platform to ensure that risk management remains relevant considering changing organisational landscape	View of issues and benefits of the existing risk management frameworks, principles and practices.
		Perceptive on how dynamic risk management can be conducted considering organisational structures

6.3. Evaluation Interview Process

6.3.1. Evaluation interview questions and presentation

Face-to-face interviews were held with the interview participants, where a PowerPoint presentation was prepared for guiding the interview. The PowerPoint interview slides were prepared in Annexure B as follows:

- Slide 1. This is the cover slide with research topic.

- Slide 2. This provides a high-level view of the background and purpose and the first question of the interview. This question was asked before the interview participants had sight of the dynamic risk management principles and framework, Annexure B.

- **Question 1 (open-ended).** What would you define as dynamic risk management principles?

- Slide 3. This provides a view of the dynamic risk management principles within the framework and provides an overview what these principles entail.

- Slide 4. This provides a high-level overview of the dynamic capabilities defined within the framework as well as the agility attributes

- Slide 5. This provides a complete view of the initial dynamic risk management framework and principles.

- Slide 6 and 7. These provide a view of the dynamic risk management process, unpacking it as per the dynamic capabilities.

- Slide 8. This provides a complete view of the dynamic risk management framework, principles and process, with the following questions:

- **Question 2 (open-ended).** How would you apply the dynamic risk management principles, framework and process?

- **Question 3 (open-ended).** What gaps have you identified in the dynamic risk management principles, framework and process?

6.3.2. Evaluation Interview Participant

6.3.2.1. Interview - Participant 1 - Group Chief Risk Officer of Traditional Organisation

A face-to-face interview was scheduled with the Group Chief Risk Officer (CRO). A copy of the interview was at hand so as to conduct the interview, but no briefing session was held nor was any explaining done prior to the interview to provide an explanation of or context to the interview. The only information that was given at the start of the interview was the background information and purpose of the study.

Response to question 1:
After the background information and purpose, question 1 was asked of the Group CRO.

Question 1: What would you define as dynamic risk management principles?

In response to the question the Group CRO indicated that in terms of dynamic risk management principles the one thing that is paramount is the close alignment to what business is doing, allowing the organisation to respond by being responsive to its environment; anticipating with the business as to what could go wrong, and looking together with the business at how the threat can be handled. The other principle defined by the Group CRO as key, is the ongoing identification, assessment and monitoring of risks as these activities are essential to the overall risk management process.

Response to question 2:
Leading to question 2 of the interview an overview of the dynamic risk management framework was provided looking at the dynamic capabilities and organisational agilities defined within the framework.

Question 2: How would you apply the dynamic risk management principles, framework and process?

In response to the question the Group CRO indicated that:

- The dynamic risk management framework can be used as an assessment tool, where a questionnaire is developed to determine the organisations' and risk practitioners dynamic capabilities and agility attributes.

- This dynamic risk management framework can also be used as a maturity assessment and used in future for benchmarking.

Response to question 3:

Lastly question 3 was asked. See below:

Question 3: What gaps have you identified in the dynamic risk management principles, framework and process

In response, the Group CRO indicated that he identified no gaps within the framework because at a principle level, the overall risk assessment as defined by other standards such as ISO31000 is not wrong however the challenge lies with how its applied, therefore the dynamic risk management process can assist in making the organisations, risk fraternity and risk practitioners understand at which level they are operating so as to improve on the way of work when it comes to risk management.

Summary:

In terms of the dynamic capabilities and the agility attributes defined within the framework, the Group CRO was of the opinion that the risk function cannot be faster or slower than the business when it comes to sensing and responsiveness. The risk function needs to follow the speed of the business. In addition to that, the view presented by the Group CRO is that dynamic risk management is not just about structure but also about the type of risk practitioner and whether it has the right personal attributes. This means that for the dynamic risk management framework to be effectively applied, one would also have to have the type of risk practitioner that is inquisitive and not afraid to challenge appropriately, wanting to make things better for the business. In essence, as much as structure is key to dynamic risk management, the engagement, diversity of skills and approach by the risk practitioner is as equally important for dynamic risk management. The challenge that may be faced by compliance areas however, may be as much as the risk function, so that it can become a tick-box approach which will keep practitioners busy. The concern lies more with being busy with the right things that actually create value and have impact on the business. In terms of seizing

risks, the culture and structure may not allow the risk fraternity to operate at the right speed and most organisations do not have the right people who can operate at the right speed. Business facilitation is a key role of the risk practitioner and this need to be done at the right speed. Effective risk management in responsive organisations cannot just be done by doing risk self-assessments as this is more of a backward approach. The measure of key risk indicators mapped to performance indicators is key. In terms of managing threat, the Group CRO felt that there is an important need for risk practitioners to maintain a common view with business in terms of who the business customer is but this requires the business to be aligned to the business.

6.3.2.2. Interview - Participant 2 - Group Strategist of Traditional Organisation that has Implemented Agile System Development Processes

A face to face interview was scheduled with the Group Strategist. A copy of the interview was at hand so as to conduct the interview but no briefing session was held nor was any explaining done prior to the interview to provide an explanation of or context to the interview. The only information that was given at the start of the interview was the background information and purpose of the study.

Response to question 1.
After the background information and purpose, question 1 was asked of the Group Strategist
Question 1. What would you define as dynamic risk management principles?
In response to the question the Group Strategist indicated that from a dynamic risk management perspective the principle of being systematic and methodical in approach does not cater for responsive organisations. The principles for dynamic risk management to be considered are:

- The embeddedness of risk within the business, allowing the risk function to walk the journey with the business but still maintaining their independent nature.
- Understanding the environment in which the business operates.

Response to question 2:
Question 2. How would you apply the dynamic risk management principles, framework and process?
In response to the question the Group Strategist indicated that this model can be used not just within the risk fraternity but across the business. In fact, he stated that the framework and

principles can be used in all business areas wanting to know their dynamic capability set and agility attributes. He also made mention that they are working on developing a dynamic strategic approach and would be interested in the end result of the framework as this may be used as an input to their process.

Response to question 3:

Question 3. What gaps have you identified in the dynamic risk management principles, framework and process?

In response to question 3 the Group Strategist indicated that:

- The visual representation of the framework seems to suggest that the dynamic capabilities and organisational agility attributes are not dynamic in their own right so it is important for the elements of the dynamic risk management framework to be represented as dynamic within them.

- The sensing/responsiveness, seizing/speed and manage / customer needs should be an iterative process and not linear or disjointed as it may currently be represented within the framework.

- The transform capability and flexibility attribute should be overarching and not linear to sensing/responsiveness, seizing/speed and manage/ customer needs.

Summary

In order for the organisation and the risk practitioners to be dynamic all the lines of defence: 1st (business), 2nd (Risk fraternity) and 3rd (independent assurance – audit) lines need to be dynamic in approach. In addition, in order for the functions to be dynamic, they need to be agile, being able to reconfigure and respond to their internal and external environment. Sensing and responsive were viewed by the Group strategist as essential as well as the ability to transform and be flexible to change. Ensuring that the risk management process is nonlinear and considerate of change is essential for effectiveness risk management because currently the business does not assist business in identification and exploitation of opportunities that may be presented to the business.

6.3.2.3. Interview Participant 3 - Head of Global Investments (Exponential Organisations)

A face-to-face interview was scheduled with the Head of Global Investments in an exponential organisation. A copy of the interview was at hand so as to conduct the interview,

but no briefing session was held nor was any explaining done prior to the interview to provide an explanation of or context to the interview. The only information that was given at the start of the interview was the background information and purpose of the study.

Response to question 1:

After the background information and purpose, question 1 was asked of the Head of Global Investments.

Question 1. What would you define as dynamic risk management principles?

In response to the question the Head of Global Investments emphasised the need for risk to consider the type of organisation they were assessing and also reconcile with the fact that risks may change in an instant and that, more than anything, the ability of risk to continuously realign themselves with what is important and pressing to the business is essential. In the light of this, dynamic risk management principles to be considered are:

- Flexibility;
- Understanding of the business; and
- Diversity in approach.

Response to question 2:

Question 2. How would you apply the dynamic risk management principles, framework and process?

In response to question 2, the Head of Global Investments indicated that this model can be used to continuously refresh the risk functions' knowledge of their agility attributes and use of dynamic capability sets to effectively identify, assess, monitor and report risks. He commented further saying that the understanding of an organisation's landscape is now becoming a very challenging task and having to support business from a risk perspective may be even more difficult because of the many moving parts. So a tool to assist the risk fraternity in being dynamic in their own right may be needed or else the work done by risk may become irrelevant as the organisational landscape changes.

Response to question 3.

Question 3. What gaps have you identified in the dynamic risk management principles, framework and process?

In response to question 3 the Head of Global Investments indicated that the framework should represent its iterative nature.

Summary

Looking at risk management in terms of advancement and use, there has been slight consideration of the organisations that are introducing enormous disruption in the business world. Sectors and industries have transformed, and this transformation had led to enormous behaviour changes, but this has not moved over to other functions that support businesses such as risk management. The Head of Global Investments indicated that great change is required in terms of how the risk fraternity engages, communicates and interacts with business. In addition to that, the use of more digital platforms or solutions to report and monitor risks needs to be considered. What is fundamental to dynamic risk management is the ability of the risk fraternity to identify and assess emerging risks, thus helping business to move to the next level that will enable them to experience exponential growth.

6.3.2.4. Interview Participant 4 - Head of Operational Risk (Financial Services – Hybrid)

A face to face interview was scheduled with the Head of Operational Risk at one of the financial services that had implemented the agile way of work and DevOps. A copy of the interview was at hand so as conduct the interview but no briefing session was held nor was any explanation given prior to the interview to providing an explanation of or context to the interview. The only information that was given at the start of the interview was the background information and purpose of the study.

Response to question 1.

After the background information and purpose, question 1 was asked of the Head of Operational Risk.

Question 1: What would you define as dynamic risk management principles?

In response to the question the Head of Operational Risk indicated the following as key principles for dynamic risk management:

- Embedding risk within the business so that they can know what the business is doing, hence moving risks from just being perceived as a check-box;
- Diverse skills and expertise;
- Building risk management into the business processes;
- Gaining an understanding of the business in terms of its internal and external context; and
- Including both business and risk into the risk identification and remediation processes

Response to question 2.

Question 2. How would you apply the dynamic risk management principles, framework and process?

In response to question 2 the Head of Operational risk indicated that the model can be used:

- For awareness of dynamic capabilities and agility attributes required for dynamic risk management, to support the risk culture shift.
- As a training tool to shift the mind-sets and the capability sets of risk practitioners to being more dynamic; and
- As a dynamic risk culture assessment tool.

Response to question 3:

Question 3. What gaps have you identified in the dynamic risk management principles, framework and process?

In response to question 3, the Head of Operational risk indicated that framework does not visually indicate how it will remain dynamic.

Summary

The risk assessment process is still relevant but what is a challenge for the risk fraternity is the practice / way of work when it comes to risk management. Part of the challenge faced by risk functions is the risk measures and methodologies that are still used as well as the values that they bring. In addition to that, apart from the methodologies, standards and measures used, risk culture still remains a key concern both in business and within the risk fraternity itself. The number of risks that the organisation is willing to take (risk appetite) is accessed by the organisation's attitude towards risk as well as its risk tolerance levels therefore such measures are key in assessing risk. However, considering how organisations now function and the level of growth they experience the challenge is also about how risk can assist business in continuously knowing its risk appetite. The organisation's risk appetite informs the level of change and innovation that an organisation is willing to take on, and for agile and disruptive organisations, risk attitude may be defined as risk seeking and being comfortable with uncertainty. As such, the culture of the organisation may also set the tone for the level of risk that the organisation is willing to undertake.

6.3.2.5. Interview Participant 5 – Chief Executive Officer of an Agile Organisation

A face to face interview was scheduled with the Chief Executive Officer (CEO) of an agile organisation. A copy of the interview was at hand so as to conduct the interview, but no

briefing session was held nor was any explaining done prior to the interview to provide an explanation of or context to the interview. The only information that was given at the start of the interview was the background information and purpose of the study.

Due to time constraints the interview participant could only be interviewed on question 1.

Response to question 1.

After the background information and purpose, question 1 was asked of the Head of Operational Risk.

Question 1. What would you define as dynamic risk management principles?

In response to the question the CEO of the agile company indicated the following as key principles for dynamic risk management:

- Embedding risk within the business;
- Risk and business forming part of the implementation and decision making processes; and
- Gaining an understanding of the business and having a sense of appreciation of the emerging risks to be experienced by the business and not just the current risks.

Summary

The key thing that was highlighted in this interview is the need for the risk function to change the approach to which they do risk. The embeddedness of risk may assist with this regard, but the level of dynamic risk management that can be applied also depends on an organisation's dynamic nature. That means that the risk function may only be as dynamic as the organisation as a whole would allow, so this may not particularly be a concern for traditional organisations. For agile organisations, the challenge for risk may be greater because these organisations are by nature designed to be responsive, either accepting or rejecting what may or may not allow them to maintain their competitive positioning. The concern may be that the risk fraternity may not be able to move with the organisation or even channel their risk efforts to focus on the risk that matters to the business at that moment.

6.4. Revised Dynamic Risk Management Framework, Principles and Process

6.4.1. Evaluation Feedback

The initial dynamic risk management framework, principles and process was evaluated through an interview process with five participants and their detailed feedback was discussed in section 6.2.3. A summary of their reflections on the dynamic risk management principles, framework and process has been provided in the table 6-2 to 6.4., looking at the three questions asked in the interview. These questions were:

- What would you define as dynamic risk management principles?
- How would you apply the dynamic risk management principles, framework and process?
- What gaps have you identified in the dynamic risk management principles, framework and process?

Question 1
What would you define as dynamic risk management principles?

Based on the interviews that were held, the information that was gathered in relation to question 1 is presented in Table 6-2. The results presented are based on the direct reference to the principles mentioned by the research participants.

Table 6-2: Summary of the research participant's evaluation feedback for question 1

Dynamic risk management principles identified by respondents
Ongoing identification, assessment and monitoring of risks
Alignment with business
Risk Embedded in business
Understanding organisational context
Flexibility
Diversity in approach.
Diverse skills and expertise
Building risk management within the business processes
Including both business and risk within the risk identification and remediation processes

Question 2

How would you apply the dynamic risk management principles, framework and process?

Based on the interviews that were held the information that was gathered in relation to question 2 is presented in Table 6-3. The results presented are based on the direct reference to the principles mentioned by the research participants; some direct quotes from the participants have also been used.

Table 6-3: Summary of the research participant's evaluation feedback for question 2

Dynamic risk management framework usage recommendations
"The dynamic risk management framework can be used as an assessment tool, whereby a questionnaire is developed to determine the organisations', risk practitioners and / or organisations' dynamic capabilities and agility attributes"
"This dynamic risk management framework can also be used as a maturity assessment and in future used for benchmarking."
Assessment tool for dynamic capability set and agility attributes across organisation
"This can be used to continuously refresh the risk functions knowledge of their agility attributes and use of dynamic capability sets to effectively identify, assess, monitor and report risks."
Tool for the awareness of dynamic capabilities and agility attributes required for dynamic risk management, to support the risk culture shift;
Training tool to shift the mind-sets and the capability sets of risk practitioners to being more dynamic;
Dynamic risk culture assessment tool

Question 3

What gaps have you identified in the dynamic risk management principles, framework and process?

In order to improve on the initial framework that had been presented, it was important to understand from the participants, the gaps they may have identified. They gaps were used to improve on the framework, thus producing the final version of the framework. These gaps are presented in table 6-4 below.

Table 6-4: Summary of the research participant's evaluation feedback for question 3

Dynamic risk management framework proposed gaps
The visual representation of the framework seems to suggest that the dynamic capabilities and organisational agility attributes are not dynamic in their own right
The sensing/responsiveness, seizing/speed and manage / customer needs should be an iterative process and not linear or disjointed as it may be represented currently within the framework.
The transform capability and flexibility attribute should be overarching and not linear to sensing/responsiveness, seizing/speed and manage/ customer needs.
Framework should represent its iterative nature
Framework does not visually indicate how it will remain dynamic.

Referring to the evaluation feedback, the following recommendations were highlighted so as to improve on the initial dynamic risk management framework:

1. To enrich the first version of the dynamic risk management framework so as to be more iterative and dynamic both visually and in practise.

2. To create a questionnaire that can be used to assess the risk function's dynamic capabilities and agility attributes while using this as a maturity assessment and awareness tool. This assessment would be used by the risk functions and organisation to assess their level of organisational agility as well as dynamic capability to perform dynamic risk management. This assessment could therefore be used by risk functions to reflect on the measures to implement so as to be more dynamic in nature.

Summary

Four of the five participants recommended that the framework be used as an assessment tool to assist business in assessing the level of maturity in terms of their dynamic capability set and agility attributes that would enable them to conduct dynamic risk management. Other recommendations that were given in terms of the use of the framework were:

- The use as a training tool, providing knowledge to the risk community on the dynamic capabilities and agility attributes;
- The use as a self-assessment tool for risk, to determine their level of growth or shift to being more dynamic in their risk management practices; and

- The use as an awareness tool of current dynamic risk management status, along with the monitoring, tracking and reporting on dynamic risk management maturity.

Therefore, the recommendations to do so have been considered. In addition to that, the need to represent the framework visually as an iterative framework has been considered in the development of the second version of the framework.

6.4.2 Revised Dynamic Risk Management Framework

This section focuses on a revised dynamic risk management framework after having taken into account the evaluation results received. For the first evaluation a graphic representation was done of the dynamic risk management framework, principles and process, and feedback was obtained.

6.4.2.1. Revised Principles

From the feedback received on the dynamic risk management principles, there was alignment with the interviewees; all interviewees agreed with the four principles as well as the core elements of agility and resilience. The principles therefore defined within the initial dynamic risk management framework remain the same with no changes after the evaluation phase. Refer to figure 6-2.

Figure 6-2 Dynamic Risk Management Principles

These principles are the foundation of dynamic risk management and should be considered when establishing the organisation's dynamic risk management framework and processes. In adopting these principles an organisation is enabled to effectively manage risk by applying their dynamic capabilities and agility attributes.

6.4.2.2. Revised Framework

In terms of the visual representation of the initial dynamic capabilities (sensing, seizing, manage and transform) as well as the agility attributes (responsiveness, speed, customer need and flexibility) the interviewees provided the feedback that visually the framework was not represented as iterative, refer to figure 6-3.
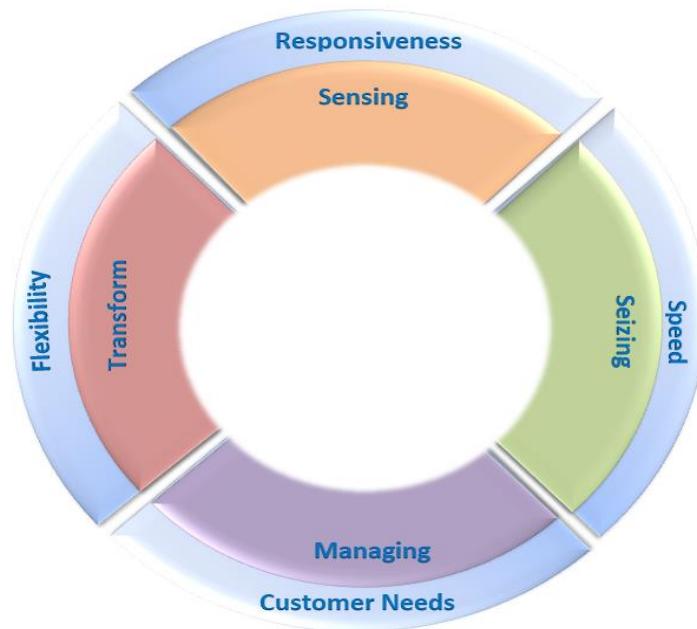
Figure 6-3 Initial dynamic capabilities and organisational agility attributes

In addition to that the interviewees' view on the "customer need" as an agility attribute within the framework was that it was limiting as organisations should have the agility attribute to consider and manage all needs as per the business's current and future needs, not just customer needs. This therefore led to the revised dynamic capability and organisational agility attributes, as well as a dynamic risk management that was visually representative of the iterative nature of dynamic risk management, refer to figure 6-4.
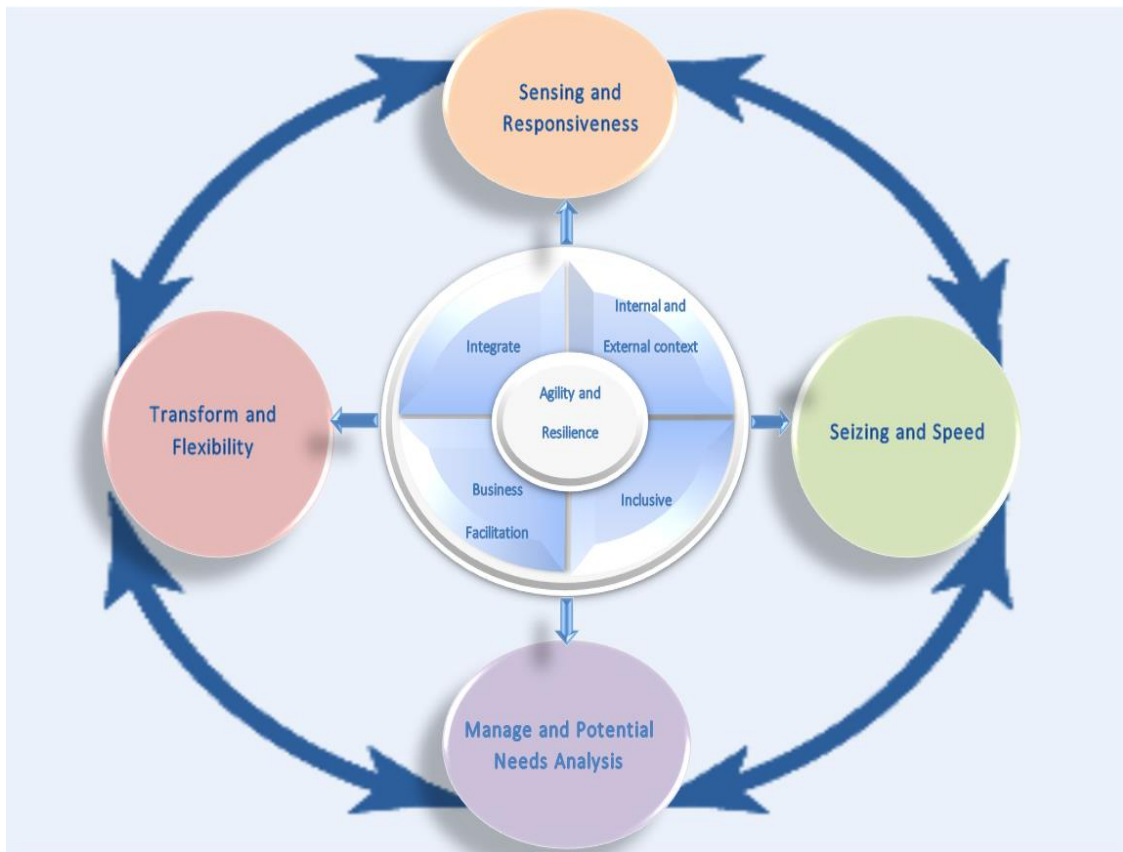
Figure 6-4: Final Dynamic risk management framework

6.4.2.2.1.. Analysis of the Dynamic Capability and Agility Attributes Quadrants

Upon taking the research participants through the four quadrants, they all advised that there would be much greater value in what this research aims to achieve if the quadrants were converted into assessment sheets that covered the risk management process looking at the organisation's or risk function's agility attributes. As per the feedback received on the usability of the framework and the quadrant, the interviewees indicated that they would use the framework as the following:

- Self-assessment tool;
- Maturity assessment tool;
- Awareness assessment tool; and
- Training assessment tool.

For those reasons and with reference to the evaluation feedback (see section 6.4), these were highlighted and the dynamic risk management framework was improved by designing an assessment tool that addresses all the tools indicated by the research participants. To address all the dynamic capabilities and agility attributes *(sensing and responsiveness, seizing and speed, manage and potential needs analysis, transform and flexibility)* four assessment sheets have been designed so as to enable the assessment of the organisation's dynamic capabilities and agility attributes at each stage of the risk assessment process.

6.4.2.2.2.. Design of the dynamic capabilities framework

The revised dynamic risk management framework consists of risk management phases, dynamic capability and agility attributes, characteristics enabling dynamic capabilities and factors influencing agility attributes. These are used to design the assessment tool in terms of:

- Firstly, linking of the risk management phases as defined within ISO31000 with the dynamic capability and agility attributes, as depicted in figure 6.5. (refer to section 5.2.3)
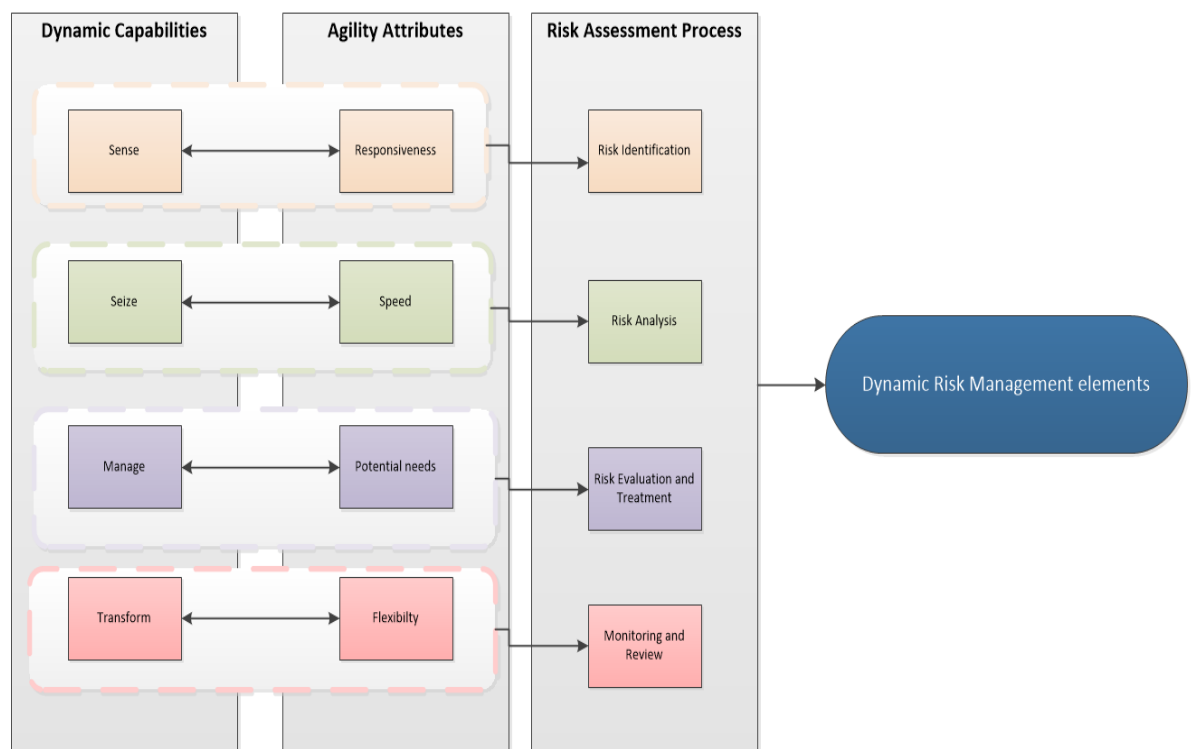
Figure 6-5: Linking the dynamic capabilities and agility attributes with the risk management process.

- Secondly, developing the dynamic risk management elements for each risk assessment process based on the characteristics that enable dynamic capabilities as well as the factors that may influence agility. These elements are linked to questions for the specific risk management process as depicted in Figure 6-6.

Seizing / Speed Questionnaire				
Seizing dynamic capabilities and speed agility attributes has an impact on the risk analysis. The combination of seizing and speed therefore influence the ability to comprehend the nature of the risk, its causes and consequences.				
Risk Management Phases	Risk Management Impact	Dynamic capability and Agilty	Characteristics enabling sensing / Factors influencing response	Dynamic Risk Management Elements
				Sensing and Responsive
Risk Analysis	The inability to comprehend the nature of the risk, its causes and consequences.	Seizing / Speed	Well-developed, defined and implemented risk measures	Well developed risk measures
Risk Analysis	The inability to comprehend the nature of the risk, its causes and consequences.	Seizing	The use of both qualitative and quantitative risk analysis techniques	Qualitative and quantitative risk measures usage
Risk Analysis	The inability to comprehend the nature of the risk, its causes and consequences.	Seizing	Availability and reliability of information/data	Availability and relaibility of information/data
Risk Analysis	The inability to comprehend the nature of the risk, its causes and consequences.	Speed	Risk Resource availability	Risk resourcing (Risk velocity)
Risk Analysis	The inability to comprehend the nature of the risk, its causes and consequences.	Seizing / Speed	Well defined risk and control matrix	Underastanding risk and control environment
Risk Analysis	The inability to comprehend the nature of the risk, its causes and consequences.	Speed	Effective decision making processes impacted by risk maagment processes	Effective decision making, impacted by risk

Figure 6-6: Dynamic risk management elements

- Thirdly, in deriving the dynamic risk management elements which are then addressed through developing assessment tool questionnaires that address these elements. The ideal score per question is prepopulated as this indicates the desired level for effective dynamic risk management. For each of the questions, a rating scale is used to determine the current state of an organisation or risk function as depicted in figure 6-7. The questionnaire is captured electronically, and a graphic view of the business's dynamic risk management capability is presented. This view is plotted against what has been defined as the ideal state (refer to Figure 5-10) that an organisation should be in, should they strive to conduct risk management in a dynamic environment.

Seizing / Speed Questionnaire			
Rating Scale: 0 = Not Applicable (not included within the report) 1 = No (included within the report) 2 = Planned (included within the report) 3 = Sometimes (included within the report) 4 = Yes (included within the report) Total ideal score for the risk identifcation phase (Sensing / Responsiveness) = 88			
Sensing / Responsiveness Questionniare		Ideal Score	Rating
#	Question		
1.	Do you have well defined risk matrix?	4	2
2.	Is the risk matrix three dimentional considering impact, likelihood and risk velocity	4	3
3.	Does risk make use of both quantitative and qualitative risk measures (combination of techniques)	4	2
4.	Does risk make sure of business data when assessing risks?	4	0
5.	Is business data readily available for the effective measurement of risks?	4	1
6.	Is the risk information stored on the central risk system accurate and complete?	4	3
7.	Is the speed at which the business can respond to the impact possibly introduced by a risk determined, considering using available resources (risk velocity)	4	2
8.	When considering risk agility is how quickly the business respond from the initial identification of a risk to the point whereby it materializes considered?	4	0
9.	Does risk have an understanding of the business control environment?	4	1
10.	Has risk developed a risk and control matrix for the business	4	
11.	Is this risk and control matrix periodically re-evalauted considering the organisations	4	
12.	Do decisions made in the business take into account the wider context and the actual and	4	2
Rating		48	16

Figure 6-7: Dynamic risk management questions linked to the elements

- Lastly, the assessment objectives of the final dynamic risk management framework are twofold, refer to figure 6-8:

1. To establish the dynamic risk management capability of the function or business being assessed by considering its current dynamic capabilities and agility attributes.

2. To assess the function or business's current dynamic risk management capability against what has been defined as ideal, this is depicted in figure 6-8 where the ideal rating and rating as per answers are shown.

Dynamic Risk Management Elements	Ideal Score	Rating
Well developed risk measures	4	3
Qualitative and quantitative risk	4	2
Availability and relaibility of information/data	4	1
Risk resourcing (Risk velocity)	4	1
Underastanding risk and control	4	1
Effective decision making, impacted by risk	4	2
	24	10
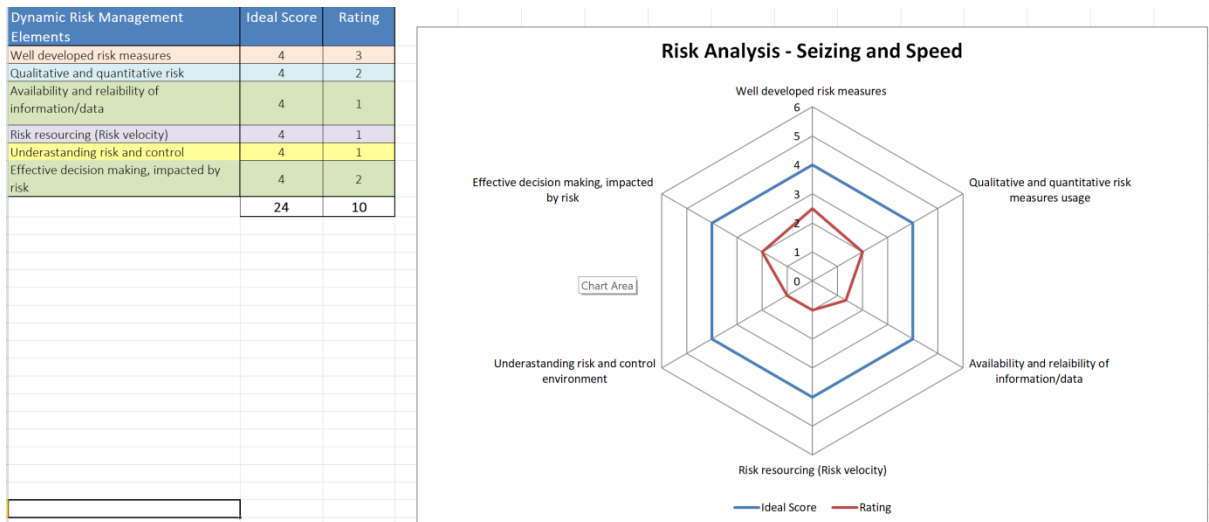
Figure 6-8: Dynamic risk management elements and graphic view of dynamic risk management level against ideal state

6.4.2.3 Application of the Final Dynamic Risk Management Framework

In order to test the usability of the dynamic risk management framework, an interview was held with the head of operational risk of two businesses. The first is a traditional business that has adopted an agile software development way of work and the second is a start-up that was agile.

The scoring of the assessment tool questionnaire is not specific to an organisational type. The score is based more on the agility attributes and dynamic capabilities, as these are what the framework defines as elements that need to be aligned for agility and resilience within the risk assessment process. The ideal state for all questions is a score of 4 and, depending on the maturity in that attribute or capability; the score could be a 0, 1, 2, 3 or 4. For the rating scale, refer to:

0 – Not applicable

1 – No

2 – Planned

3 – Sometimes

4 – Yes

A rating scale for the questionnaire is used where the results of the assessment are presented as per the four elements of dynamic capabilities and agility attributes (refer to figure 6-9).

Figure 6-9: Dynamic Risk Management framework – Rating Scale

In the next sections, the researcher presents a view of the questionnaire as well as the results of the assessment for both the agile and traditional organisation. The results of the two organisations is presented in one graph for each of the dynamic risk management processes *(sensing and responsiveness, seizing and speed, manage and potential need, transform and flexibility.*

6.4.2.4.1. Sensing and Responsiveness

Sensing dynamic capabilities and responding agility attributes have an impact on the identification of risks by the organisation and risks function. The combination of sensing and responsiveness therefore influences the ability to recognize and describe risks that may assist in and/or prevent business from achieving their business objectives.

The assessment was completed for both businesses; assessing the organisations' sensing capabilities and responsiveness agility attributes. A rating scale of 0-4 is used for each question so as to assess how the organisation rates in comparison to the ideal dynamic state and the questions are not weighted.

Following the completion of the sensing and responsiveness assessment questionnaire, the results are graphically presented against the ideal state of the identified elements; refer to figure 6-10..
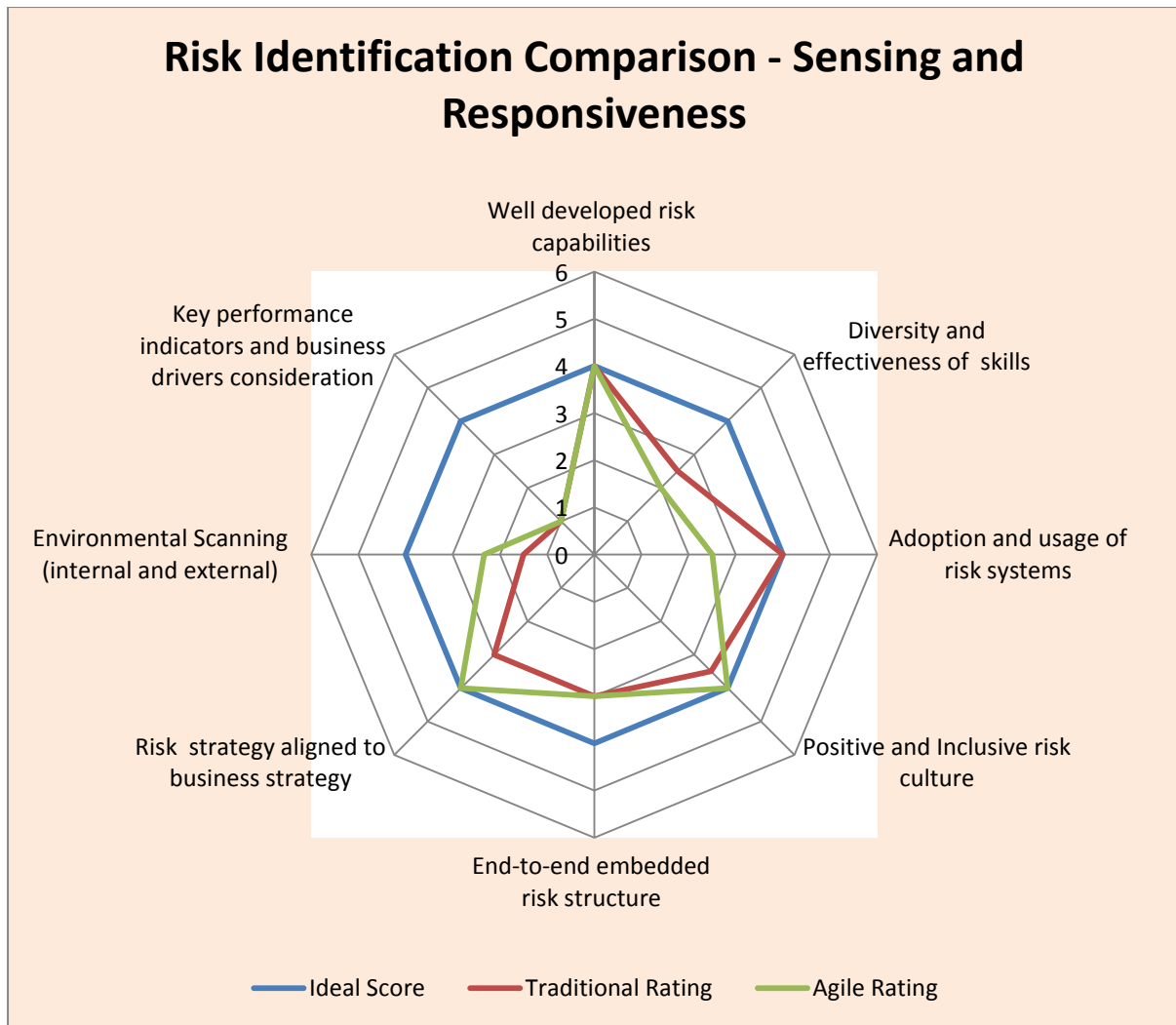
Figure 6-10: Risk Identification – Sensing and Responsiveness results

6.4.2.4.2. Seizing and Speed

Seizing dynamic capabilities and speed agility attributes has an impact on the risk analysis. The combination of seizing and speed therefore influences the ability to comprehend the nature of the risk, its causes and consequences. The assessment was completed for both businesses; assessing their seizing dynamic capability and speed agility attribute, refer to figure 6-11 A rating scale of 0-4 is used for each question so as to assess how the organisation rates in comparison to the ideal dynamic state and the questions are not weighted.

Upon the completion of the seizing and speed assessment questionnaire, the results are presented against the ideal state of the identified elements, refer to figure 6-11
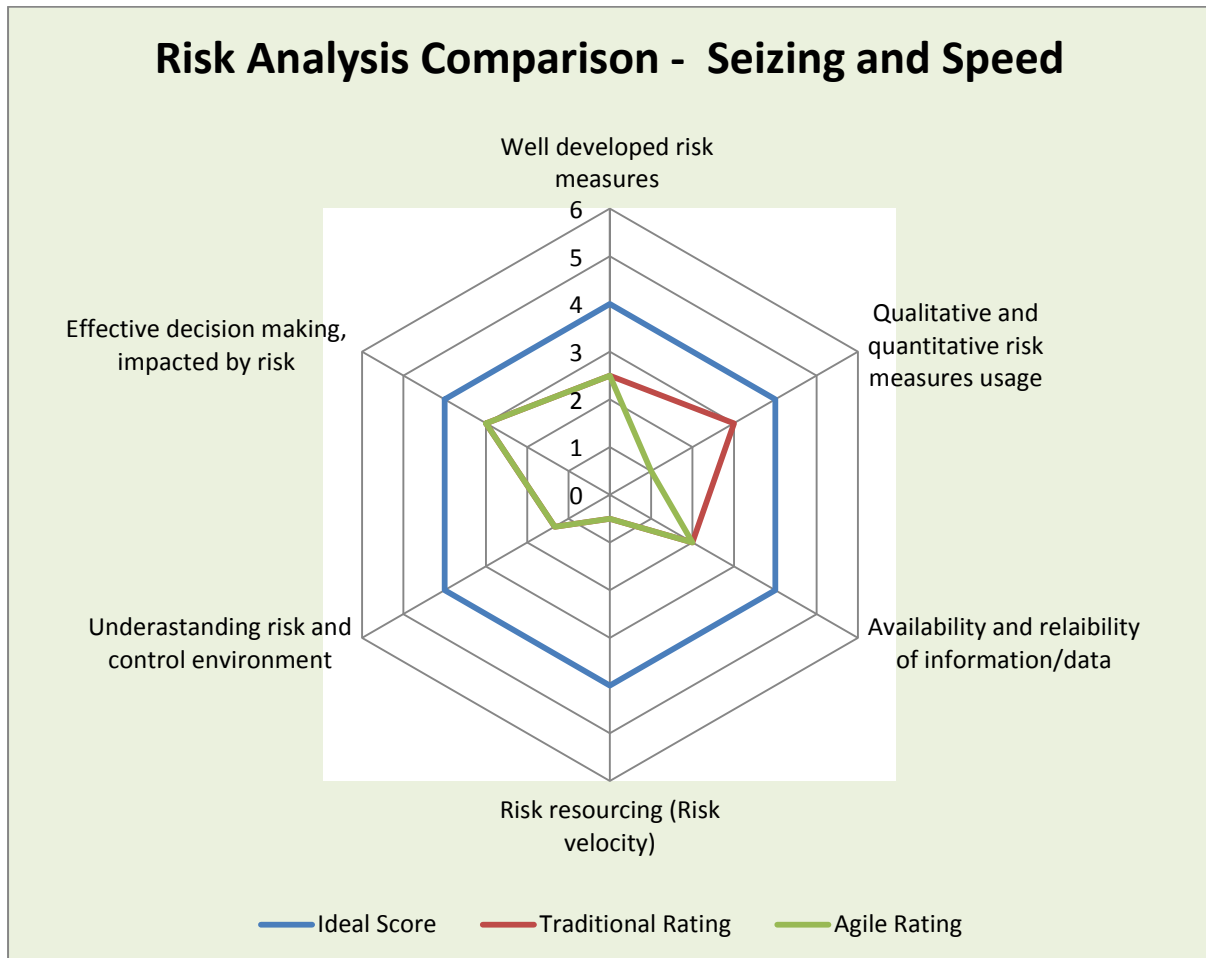
Figure 6-11: Risk Analysis – Seizing and Speed results

6.4.2.4.3. Manage and Potential Need

Manage dynamic capabilities and *understanding of potential needs* agility attributes has an impact on the risk evaluation phase. The combination of *manage* and *potential* need to be understood, and therefore influence the ability to support decision making processes because the risk evaluation phase involves comparing the results of the risk analysis with the established risk criteria to determine where additional action is required. This impact on decisions to facilitate competiveness, profitability, market penetration, value creation and customization. Therefore organisations and risk must understand their capability set so as to

foster effective risk management. In addition, the risk treatment process is an iterative process that involves choosing the most appropriate treatment options and understanding the benefits to be gained. The assessment was completed for both businesses assessing their *manage* capability and *potential need analysis* agility attribute. A rating scale of 0-4 is used for each question so as to assess how the organisation rates in comparison to the ideal dynamic state and the questions are not weighted.

Upon the completion of the manage and potential needs assessment questionnaire the results are presented against the ideal state of the identified elements, refer to figure 6-12
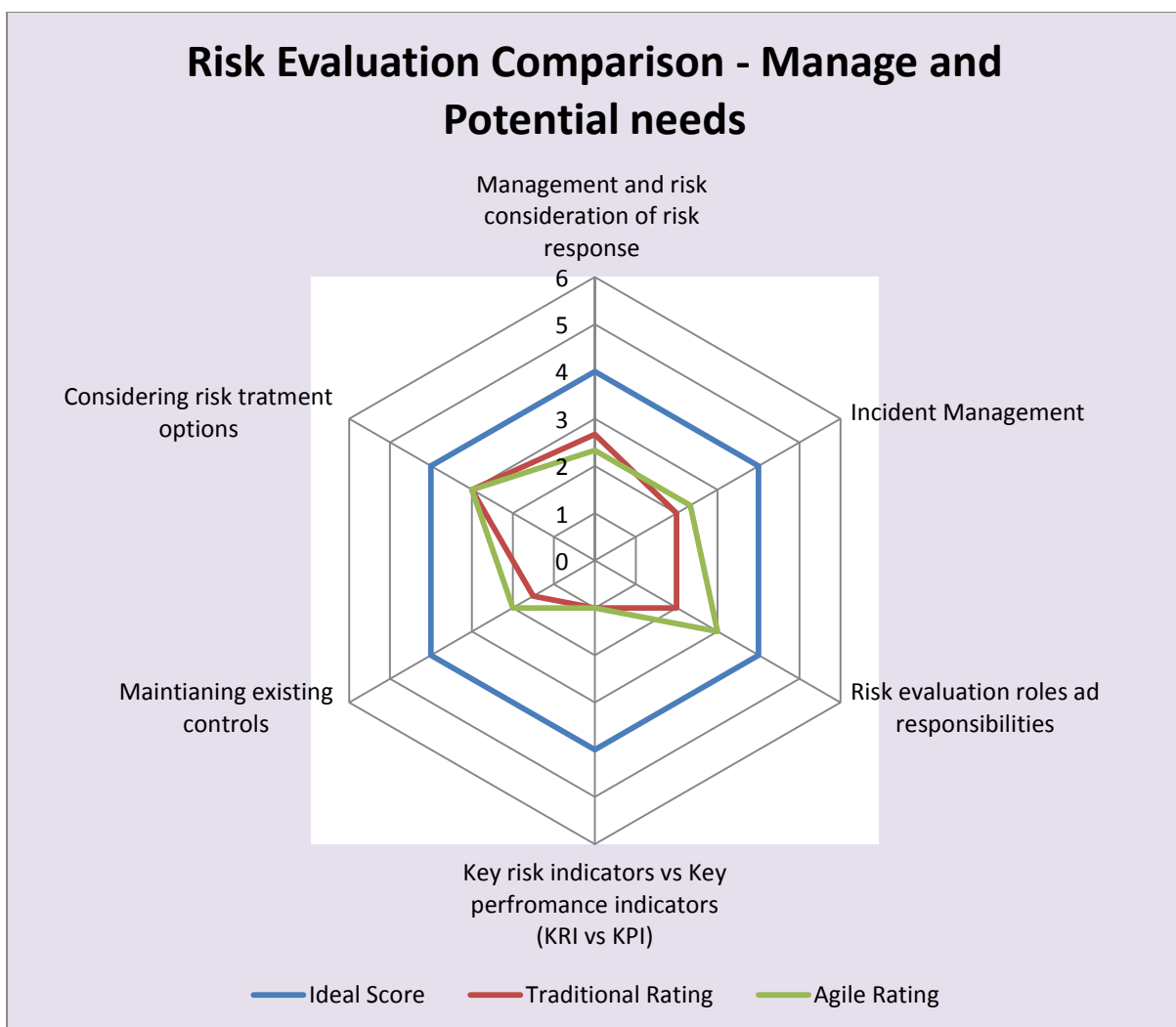
Figure 6-12: Manage and potential needs dynamic risk management results

6.4.2.4.4. Transform and Flexibility

The *transform* capabilities and *flexibility* agility attributes have an impact on risk treatment. The combination of *transform* and *flexibility* therefore influences the ability to formulate, plan and effectively treat risks. Monitoring and review is an iterative process to assure and improve the quality and effectiveness of process design, implementation and outcomes. Ongoing monitoring and periodic review of the risk management process is essential particularly when operating in a dynamic environment, so the outcomes should be a planned part of the risk management process, with responsibilities clearly defined.

A assessment has been developed to assess the organisation's transform capability and flexibility agility attributes. A rating scale of 0-4 is used for each question to assess how the organisation rates in comparison to the ideal dynamic state and the questions are not weighted.

Upon the completion of the transform and flexibility assessment questionnaire the results are presented against the ideal state of the identified elements. Refer to figure 6-13.
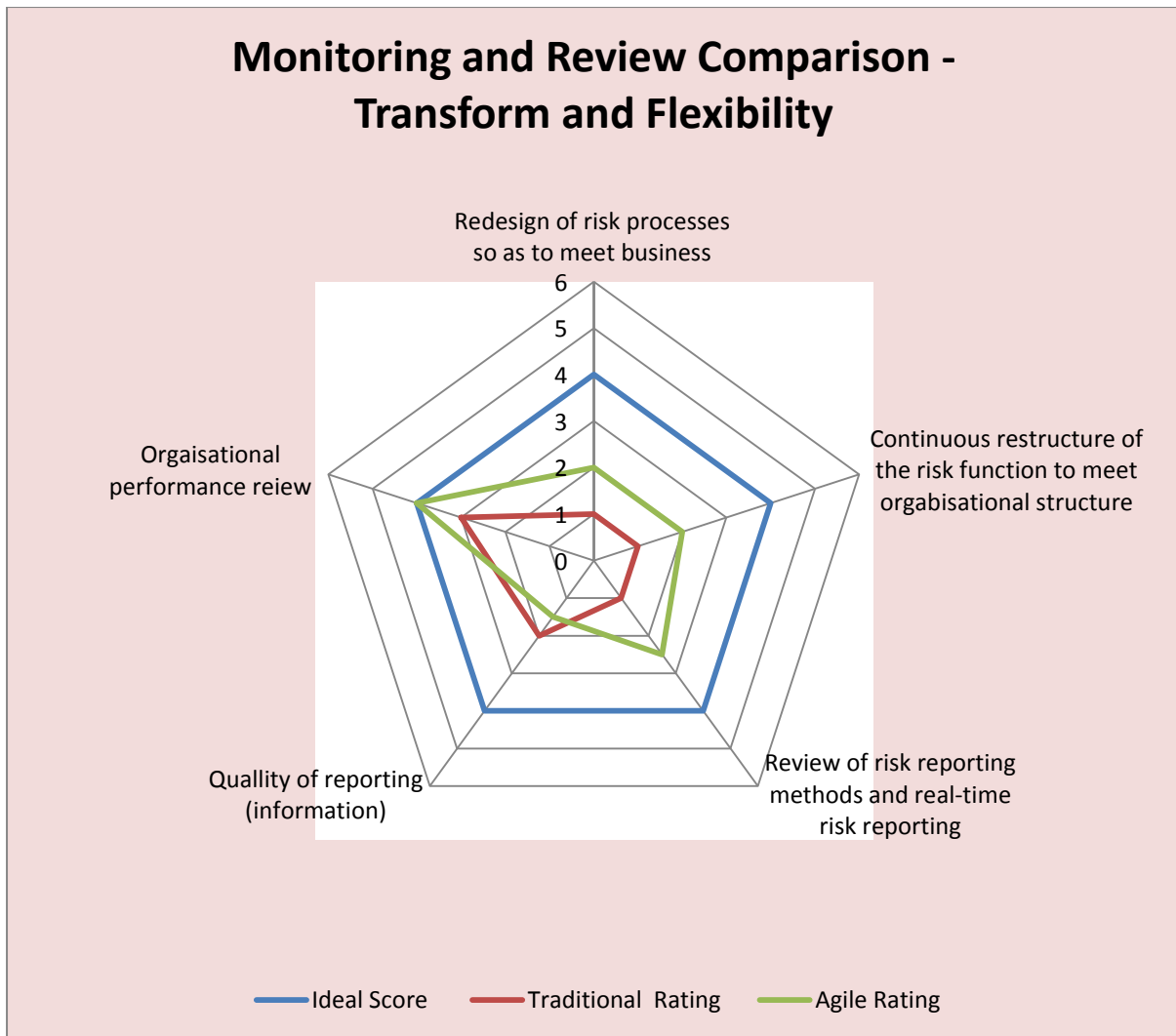
Figure 6-13: Transform and Flexibility dynamic risk management results

6.5. Conclusion

This chapter provided a step-by-step view of the proof of concept phase of the research, looking at the evaluation interviews held and the results of the interviews. The implications of the findings were presented and then considered for the changes to the initial dynamic risk management framework based on these interviews. This led to the development of a new dynamic risk management framework as well as an assessment tool. This assessment tool allows organisations and risk functions to understand their dynamic capability set and agility attributes, knowing what impact it may have on the risk management process thus impacting the ability to perform effective risk management. The purpose of the evaluation of the initial

framework was to determine the usability of the dynamic risk management framework and upon receiving the evaluation feedback to revise the framework as per the feedback received.

The objectives of developing the final dynamic risk management framework were to ensure that the framework was usable but more importantly to develop a framework that would guide an organisation as to what can be done in order to conduct risk management in a dynamic environment. This was done by:

1. Developing a dynamic risk management framework that would enable an organisation and its risk function to assess their dynamic capability and the agility attribute of the function or business being assessed by considering their current dynamic capabilities and agility attributes; and

2. To assess the function or current business dynamic risk management capability against what has been defined as ideal.

The revised framework was further tested with two organisations: a traditional organisation that has adopted an agile way of work, as well as an agile organisation.The final dynamic risk management framework therefore allows the two businesses to assess their dynamic capability and agile attributes in order to conduct dynamic risk management.

PART 5: Contribution and Conclusion

Part 5 of this study consists of chapter 7 and chapter 8 which constitute the contribution of the study and the conclusion of the study. The purpose of this phase is to provide a conclusion for this study and to summarise what each chapter entailed.

This study consists of 5 research design phases. The first phase is the literature review phase, the second is the design and development phase, the third is the proof of concept and the fourth is the integration of findings phase. The dynamic risk management framework developed in this research is first presented in the third phase and an evaluation of the framework and principles is done in the fourth phase. This phase is the conclusion of the study and consists of chapter 7, which outlines the contribution that this research study makes to the body of knowledge in the field and chapter 8, which is the conclusion of the study.

Chapter 7: Contribution

This chapter outlines the contribution that this study brings from a theoretical and practical perspective. The chapter consists of section 7.1 which is the introduction, section 7.2, providing an overview of the dynamic risk management framework developed while section 7.3 contains a description of the dynamic capabilities framework developed and provides a graphic representation of the framework. The components of the framework, consists of a graphic representation of the component, the dynamic risk management elements, a questionnaire and a radar chart indicating the assessment outcomes. The application of dynamic risk management framework is considered in section 7.4, thereafter the contribution of the dynamic risk management framework is discussed from a practical perspective in section 7.5 and a theoretical perspective is offered in section 7.6. The summary is then provided in section 7.7.
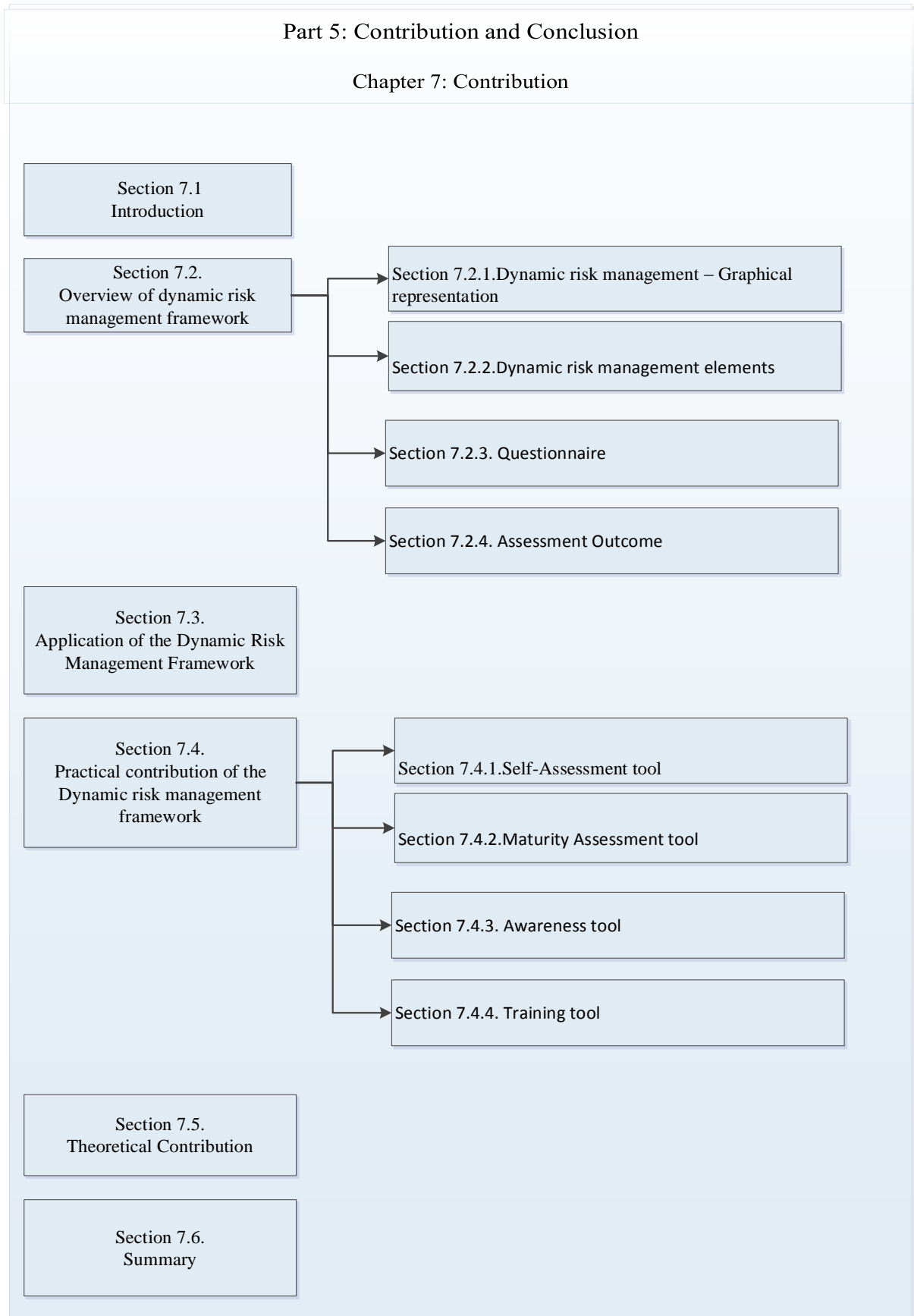
Figure 7-1: Overview of chapter 7

7.1. Introduction

This research contributes towards the need for a risk management framework which can be applied in dynamic environments. This need was identified because organisations are now required to sense and anticipate business changes. The ability to sense, seize, manage and transform are dynamic capabilities that must be understood and mapped to the organisation's level of agility. Risk management is a key tool for decision making therefore it is important for organisations to establish a successful risk management programme proportional to the level of risk in the organisation relating to the size, nature and complexity of the organisation.

Extensive research has been done on risk management, the dynamic capabilities and the nature of agility as well as organisational structures. The global financial crisis in 2008 demonstrated the importance of adequate risk management (Nair et al., 2013) and since that time, new risk management standards have been published, including the international standard, ISO 31000 'Risk management – Principles and guidelines' (2009). The findings of the research by (Nair et al., 2013) indicate that the risk management requirements for managing changes in the environment are different. As a result, increasing dynamic risk management capabilities is becoming of importance to an organisation. In addition to that Nair suggests the development of a more precise profile of the characteristics of dynamic capabilities and risk management.

7.2. Overview of Dynamic Risk Management Framework

There are four components of the dynamic risk management framework as is shown in the figure 7-2; namely, 1) the graphic representation of the elements, 2) the identified dynamic risk management elements which are mapped to the risk management process, 3) the questionnaire which consists of questions that have been mapped to the dynamic capabilities and agility attributes using a rating scale of 0-4 and 4) the radar chart which presents the outcomes of the assessment, figure 7-2.

Graphical Representation

Dynamic risk management elements

Instrument

Radar Chart of outcomes

Figure 7.2: Dynamic risk management framework components

Each of these components makes a unique contribution to the overall framework and represents the tangible outcomes of this study. An overview of the dynamic risk management framework is given in section 7.2, dynamic risk management principles, agility attributes and dynamic capabilities are shown in section 7.2.1 (graphic representation), section 7.2.2 provides dynamic risk management elements, section 7.2.3 contains the questionnaire and section 7.2.4 shows assessment outcome/results.

7.2.1. Dynamic Risk Management – Graphic Representation

The dynamic risk management framework consists of five main elements as shown in Figure 7.3.
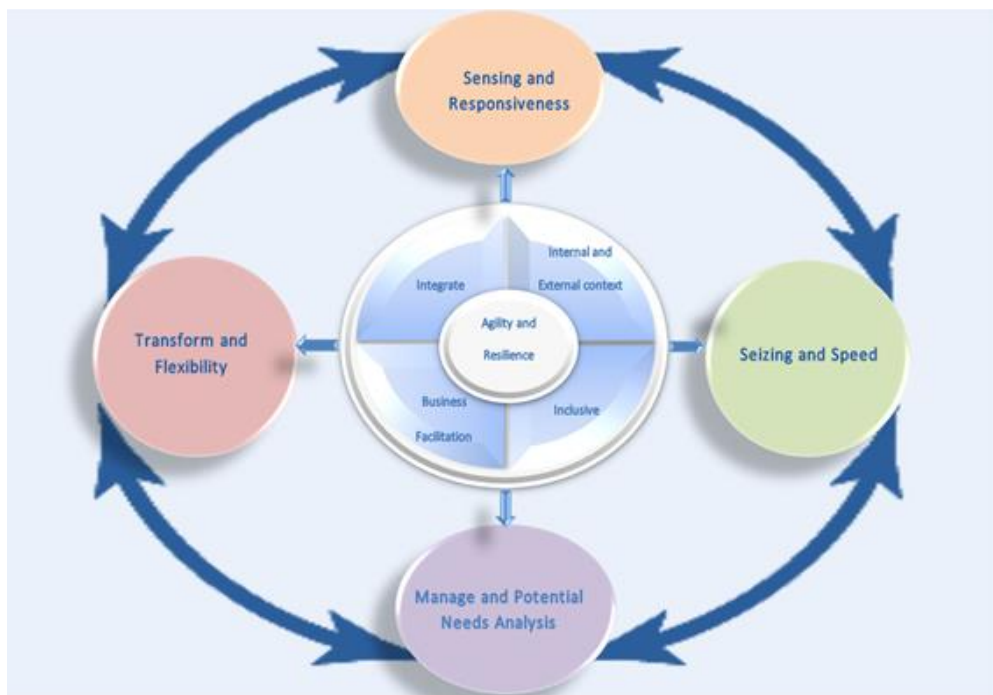
Figure 7-3: Dynamic Risk Management Framework

The first element consists of the dynamic risk management principles which are a visual representation in the centre of the framework. Four main principles were identified as the foundations of the framework: *internal and external context*, *inclusive*, and *business facilitation and integrate*. These principles as the foundation to effective risk management which creates agility and resilience. The dynamic risk management principles are visually represented in the centre of the framework.

Circling the dynamic risk management principles are the dynamic capabilities and agility attributes. These are defined as being:

- Sensing and Responsiveness;
- Seizing and Speed;
- Manage and potential need; and
- Transform and Flexibility.

All of these components make up the dynamic risk management framework and for each element defined within the framework (apart from the principles in the centre) dynamic risk management elements are identified, and these are then used for the measurement instrument which consists of a questionnaire.

7.2.2. Dynamic Risk Management Elements

To identify the dynamic risk management elements of the framework the characteristics enabling dynamic capability (*sensing, seizing, manage and transform*) as well as the agility attributes *(responsiveness, speed, manage potential and flexibility)* from a risk management perspective were identified, figure 7-4. These are then mapped to the risk management process *(identify, assess, evaluate, monitor and report)*.

The areas that are listed in the dynamic risk management elements are therefore:

- The risk management process which aligns to the dynamic capability and agility attribute;
- The risk management impact;
- The identified dynamic capability and agility attribute;
- Characteristics enabling the dynamic capability i.e. *sense*; and
- The factors impacting agility i.e. *responsiveness*.

Risk Management Phases	Risk Management Impact	Dynamic capability and Agility attributes	Characteristics enabling sensing / Factors influencing response	Dynamic Risk Management Elements Sensing and Responsive
Identification of risks	Ability to effectively identify, recognise, describe and respond to risks.	Sensing	Well-developed capabilities in risk management	Well-developed risk capabilities
Identification of risks	Ability to effectively identify, recognise, describe and respond to risks.	Sensing	Diversity in skills within risk	Diversity and effectiveness of skills
			Effective risk resource utilisation skills	
Identification of risks	Ability to effectively identify, recognise, describe and respond to risks.	Sensing	Adopted and used risks systems	Adoption and usage of risk systems
Identification of risks	Ability to effectively identify, recognise, describe and respond to risks.	Sensing	Positive and inclusive risk culture	Positive and Inclusive risk culture
		Responsiveness	Risk inclusiveness in project and programme activities,	
Identification of risks	Ability to effectively identify, recognise, describe and respond to risks.	Sensing	End –to-end risk function incorporating legal, risk and compliance	End-to-end embedded risk structure
		Responsiveness	Risk embeddedness in business	
Identification of risks	Ability to effectively identify, recognise, describe and respond to risks.	Sensing	Risk strategy is to be aligned to the business strategy	Risk strategy aligned to business strategy
Identification of risks	Ability to effectively identify, recognise, describe and respond to risks.	Responsiveness	Risk understanding of organisational threats / vulnerabilities	Environmental Scanning (internal and external)
Identification of risks	Ability to effectively identify, recognise, describe and respond to risks.	Responsiveness	Risk reporting aligned to key performance indicators and key business drivers	Key performance indicators and business drivers consideration

Top banner text: Sensing dynamic capabilities and responding agility attributes has an impact on the identification of risks by the organisation and risks function The combination of sensing and responsiveness therefore influence the ability to recognise and describe risks that may assist and/ or prevent business in achieving their business objectives.

Figure 7-4: Dynamic Risk Management elements mapped to the risk assessment process

For each of the four components of the dynamic risk management framework, dynamic risk management has been identified.

7.2.3. Assessment Questionnaires

From the dynamic risk management elements identified, questions have been developed so as to determine the dynamic risk management capability as well as the agility attributes. These questions are not weighted, with each question equalling to 4. The rating scale that has been used for the questionnaire is:

0 = Not Applicable (Not to be included in report)

1= No (Include in report)

2=Planned (Include in report)

3=Sometimes (Include in report)

4=Yes (Include in report)

The questions are mapped to the dynamic risk management element that was identified and the rating scale selected upon answering the question impacts the dynamic risk management elements.

The assessment questionnaire can be used to rate one entity (organisation / risk function) or to compare two entities such a traditional organisation and an agile organisation or to compare two risk functions within an organisation.

Rating Scale:
0 = Not Applicable (not included within the report) / 1 = No (included within the report / 2 = Planned (included within the report) / 3 = Sometimes (included within the report) / 4 = Yes (included within the report). Total ideal score for the risk identification phase (Sensing / Responsiveness) = 88. No weight assigned to questions. Each question = 4

#	Sensing / Responsiveness Questionnaire — Question	Ideal Score	Trad. Rating	Agile Rating
1.	Do you have well defined risk methodologies and standards?	4	4	4
2.	Do you have well defined risk taxonomies (risk classification)?	4	4	4
3.	Are risks identified classified in accordance to risk types?	4	4	4
4.	Are there diverse skills within the risk function i.e. data analytic, system development, IT, compliance, legal, project management?	4	2	2
5.	Is resource planning done?	4	3	4
6.	Is resource planning done in alignment to the risk activities to be performed?	4	4	1
7.	Are risk activities to be carried out reassessed based on risk resourcing (risk velocity)?	4	1	1
8.	Do you have centralised risk systems in place?	4	4	4
9.	Do you use the risk system for risk planning, capturing of losses and tracking of issues?	4	4	1
10.	Is there a positive and inclusive risk culture within the business?	4	4	4
11.	Is risk included in all project and programmes planned and executed within the business (both agile and waterfall)?	4	3	4
12.	Does your business have an end-to-end risk function that incorporates risk, legal and compliance?	4	2	2
13.	Is the risk function embedded within business?	4	4	4
14.	Is the risk strategy aligned to the business strategy and /or objectives	4	3	4
15.	Is the risk strategy continuously realigned to the business strategy and /or objectives	4	3	4
16.	Does risk understand the internal environment of the business i.e. strategy, processes, policies, structure, key initiatives etc.	4	1	4
17.	Does risk understand the external environment of the business i.e. competitors, market segment & penetration, legislation etc.	4	4	4
18.	Has the current threats / vulnerabilities of the business been identified?	4	1	3
19.	Has the emerging threats / vulnerabilities of the business been identified?	4	1	1
20.	Has risk together with business identified the threat and vulnerability landscape of the business (internal and external)?	4	1	1
21.	Has an impact analysis been done on the threat and vulnerability landscape?	4	1	1
22.	Has key risk indicators been defined and agreed in alignment to key performance indicators?	4	1	1
Rating		**88**	**59**	**62**

Figure 7-5: Dynamic Risk Management assessment questionnaire

7.2.4. Assessment Outcomes

The last tangible component of the dynamic risk management framework is the assessment outcome that is represented in a radar chart, depicted in Figure 7-6. The purpose of the assessment results is to identify the level at which the dynamic risk management elements are applied within a function or organisation. In addition to that it allows for the analysis of data captured in the questionnaire against the ideal profile and reports on the gaps that may exist.
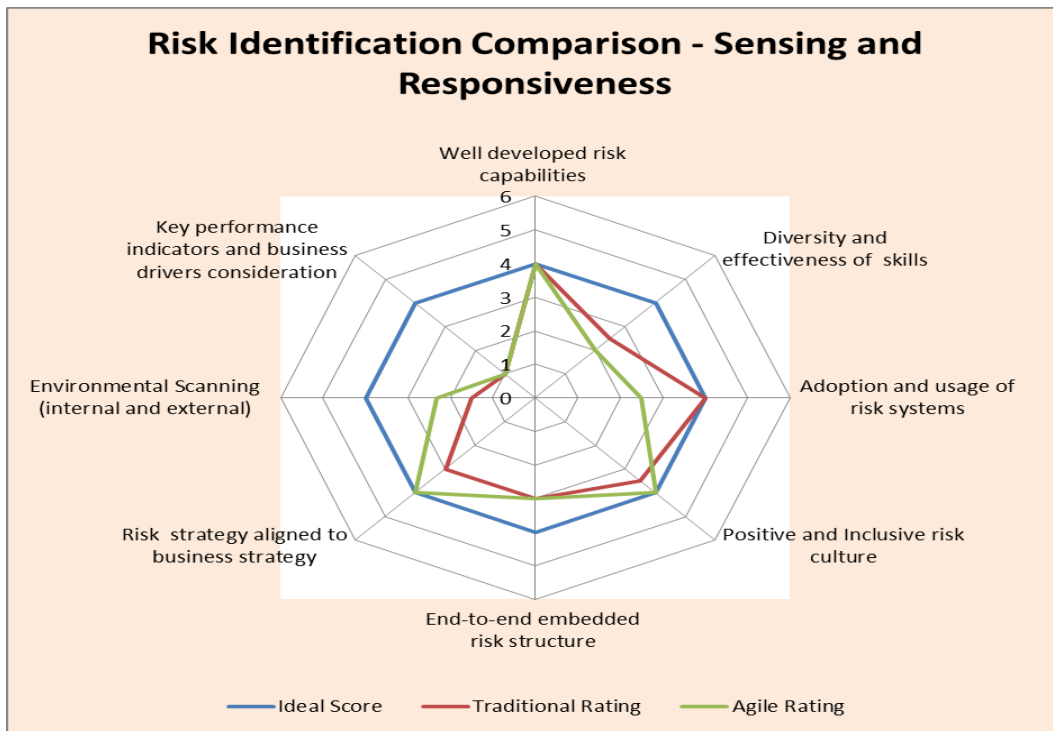
Figure 7-6: Dynamic Risk Management assessment outcome

In figure 7-6, the blue line outlines the ideal state for each dynamic risk management element, while the green line represents the results of the first organisation and the red line the second organisation. The gap reporting shows dynamic risk management elements that must be addressed so as to enable more dynamic risk management.

7.3. Application of the Dynamic Risk Management Framework

In order to apply dynamic risk management framework practically, only one step needs to be taken, that being the completion of the dynamic risk management element you want to assess There are four excel tabs relating to the four elements of the framework namely (*sense, seize, manage and transform*).

A graph is automatically generated with the gaps highlighted within the graph. If one entity was *assess*, two lines will be represented on the graph: one being the ideal state and the other the state of the organisation or function as per the answered questions. The gap constitutes the dynamic risk management elements required in order to conduct dynamic risk management.

The method for applying the dynamic risk management framework, described in this section, refers to all four elements of the dynamic risk management framework. However, the assessment can be applied on just one of the elements i.e. *seize* and *speed* based on the requirements for the assessment and the stage of the dynamic risk management element being measured.

7.4. Practical Contribution of the Dynamic Risk Management Framework

This study and, in particular the dynamic risk management framework has contributed to addressing the need for continual assessment of an organisation's and/or risk function's dynamic risk management elements by:

- Mapping the risk management process to dynamic capabilities and agility attributes;
- Defining characteristics of dynamic capabilities and factors influencing agility per risk; management phase;
- Identifying dynamic risk management elements to be assessed against;
- Defining an ideal dynamic risk management state; and
- Proving an assessment tool that is able to provide feedback real-time.

It has been established that the dynamic risk management framework contributes to the scientific domain and, in particular, makes a contribution in terms of frameworks for risk management within a dynamic environment. With regard to the product contribution, an assessment tool has been developed that may be used as:

- Self-assessment tool;
- Maturity assessment tool;
- Awareness assessment tool; and
- Training assessment tool.

7.4.1. Self-Assessment Tool

In an organisational environment that is constantly changing, more proactive measures need to be applied by risk management functions so as to ensure that they are able to meet the needs of the organisation that they support. The dynamic risk management framework can be used as a self-assessment tool that provides the risk function with a view of what needs to be improved. This assessment can be used every time there is a change in the risk function because then the impact of that change, whether methodological, staffing or structural, can be

measured in terms of the impact it has on the dynamic risk management elements as well as the impact on the risk assessment process (risk identification, risk assessment and evaluation, risk monitoring)

7.4.2. Maturity Assessment Tool

As organisations become better at integrating risk management with strategy and performance, an opportunity to strengthen agility and resilience will present itself. By knowing the dynamic risk management elements that are lacking and the impact that they may have on organisations, they can use the dynamic risk management framework to assist in identifying the elements to mature.

7.4.3. Awareness Assessment Tool:

In conferences and in internal risk talks the risk fraternity can use the tool to create awareness amongst the risk community of what needs to be implemented in order to better sense and respond to risks, seize opportunities and manage risks that may impact on business needs or transform to the next risk level of maturity.

7.4.4. Training Assessment Tool

What is required for risk function to be more dynamic in its practice is still unknown for most risk communities within organisations. Having done this study, the dynamic risk management elements have been defined and this knowledge can therefore be used for others to gain an understanding of what is required, but the tool in itself can be used to train risk communities and organisations to assess their own environment and structures.

This study contributes to achieving the purpose of developing a dynamic risk management framework and principles that all organisations can use to conduct risk management in a dynamic environment. As such the study contributes to the scientific body of knowledge by developing a framework and an assessment tool.

7.5. Theoretical Contribution of the Dynamic Risk Management Framework

This study contributes to achieving the purpose of developing a dynamic risk management framework and principles that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment.

As per literature, table 7-1 is summarised on the basis of a literature review. The first column in the table provides the gap area and reference and the second column reflects the way in which the dynamic risk management framework was developed in order to close the gap.

Table 7-1: Theoretical contribution

Literature Gaps	Contribution
Understanding that adequate risk management capabilities are needed when operating in an environment of uncertainty (Walczak et al., 2013) .	The dynamic risk management framework looks at the dynamic elements needed for an organisation and/or risk function to implement so as to be in a position to conduct risk management in a dynamic environment.
During different environmental changes it would help to develop a more precise profile of the characteristics of dynamic capabilities and ERM (Nair et al., 2013)	The dynamic risk assessment tool can be used to determine the characteristics of dynamic capabilities and the influence of agility in any stage of the risk assessment process (identify, assess and evaluate, monitor an report)
Risk management would be the product of both agility and capability, expressed as: Risk Management effectiveness =Agility X Resiliency (Davis & Lukomnik, 2010)	Four core dynamic risk management principles have been defined with the core elements of agility and resilience. In addition agility attributes and dynamic capabilities are mapped to the risk management process, measuring an organisation and /or risk function against dynamic risk management elements
Understanding an Organisation's risk profile is essential because consequences of a risk can impact the organisation's economic performance, professional reputation, regulatory and legal stand point. Hence the rate at which a risk can manifest and the impact that it may have, can be seen as a measure that needs to be thought of when measuring risk (Davis & Lukomnik, 2010).	The organisation's dynamic risk management profile is assessed in terms of risk identification, risk analysis, risk evaluation, risk treat as well as monitor and review as well as the rate at which an organisation can respond to a risk is specifically measure in risk analysis and evaluation.
VO's are distributed, networked organisations with fluid and shared business processes, hence risk in the VO can migrate between organisational members, making risk identification and mitigation difficult (Grabowski & Roberts, 2006)	Effective risk management = agility and resilience. The dynamic risk management framework allows organisations to understanding the organisation's risk identification and mitigation capability, considering both dynamic capabilities and agility attributes.
To make the most of risk management efforts and to benefit from this practice, responsive organisations need ensure that their risk management practice has well defined sensing capabilities that will allow the organisation to identify, analyze and measure risks as well as identify emerging opportunities (Nair et al., 2013)	The dynamic risk management framework is developed as an assessment tool that looks at the organisation's risk sensing and responsive capabilities so as to conduct risk within a dynamic environment.

7.6. Summary

A dynamic risk management framework and principles has been developed through the five phases of the research design. This chapter provides an overview of the framework developed, and concludes with the practical and theoretical contribution of the study.

The study contributes to the research domain from a practical and theoretical perspective where dynamic risks management elements that can be applied to conduct dynamic risk management have been identified. It allows for the analysis of gaps that may exist within the risk assessment process when conducting risk assessments. Dynamic risk management principles have been developed and these are the foundation of the framework. The assessment tool developed enables responsive organisations to measure and assess themselves in terms of their dynamic capabilities as defined by Teece (2016) as well as the agility attributes as stated by Ganguly (2009) .

Chapter 8 –Conclusion

The purpose of this chapter is to provide a conclusion for this study and to summarise findings for the primary research question and each of the research objectives
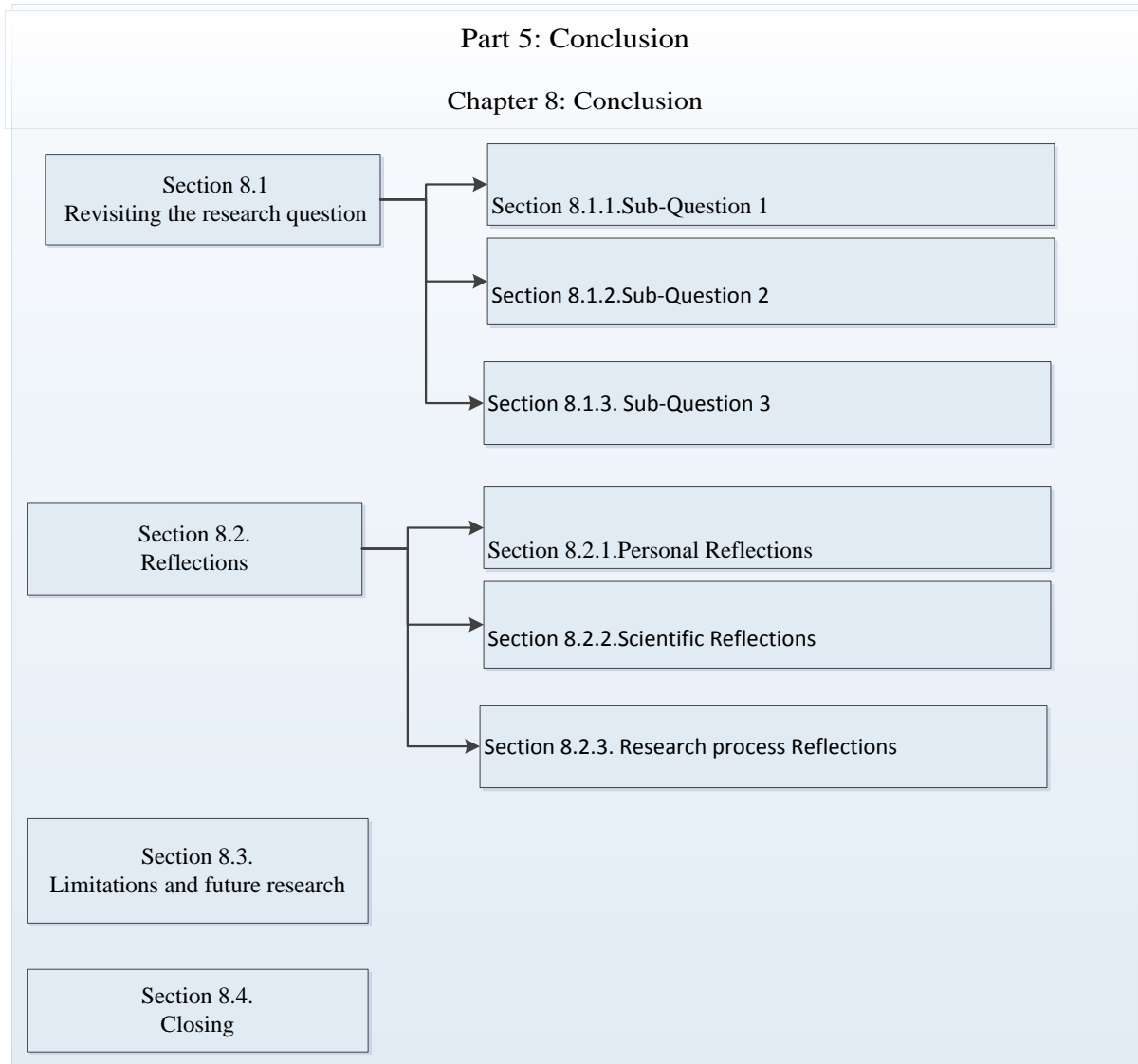

Figure 8-1: Overview of chapter 8

8.1. Revisiting the Research Questions

The crux of organisational agility is how an organisation responds to aggressive competitors and navigates volatile markets (Burba, 2015). With that said, the practicality of agility within risk management had to be considered from a guidance and implementation perspective so this research aimed to develop a dynamic risk management framework and principles that will guide an organisation to apply more dynamic risk management principles in a dynamic environment. Based on the research objectives, this research aims to answer the following main question.

MQ: What are the elements of a framework that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment?

The following sub-research questions (SQ) assisted in answering the main research question:

- **SQ1** - What constitutes a traditional risk management framework?
- **SQ2** - What are the guiding principles that organisations use in risk decisions?
- **SQ3** -What constitutes risk management in dynamic environments?

8.1.1. Sub-Question 1

SQ1 - What constitutes a traditional risk management framework?

Risk Management frameworks were presented in chapter 2 with section 2.2 looking at the risk management principles, frameworks, and process and risk culture. Based on the literature review, the *Risk Management Principles and Guide ISO 31000* was published in 2009 as an internationally agreed standard for the implementation of risk management principles (ISO, 2009) and the risk management process is referred to as an integral part of management and decision making.

The risk management processes are defined within ISO31000 as a systematic process that involves a risk assessment of the:

- Identification of risks;
- Analysis of risk;
- Evaluation of risk;

- Treatment of risk treatment; and

- The monitoring and review of risk.

Data collected from the online questionnaires also indicated that traditional frameworks for risk management known as ISO31000 and COSO, underpinned by a set of principles need to be supported by a structure that considers the internal and external organisational structures (refer to section 5.2.1.2). Both in literature and in the data collected the risk management framework is said to be proportional to the level of risk in the organisation looking at the complexity, size, culture and nature of the organisation. In this research the risk assessment process defined within the traditional risk management process is mapped to the dynamic capabilities and agility attributes and for each process phase the dynamic nature of an organisation and/or risk function is assessed.

8.1.2. Sub-Question 2

SQ2 - What are the guiding principles that organisations use in risk decisions?

The risk management principles were presented in chapter 2, section 2.7.1 and are stated within the risk management frameworks COSO and ISO3100. Risk management is defined as a process that is underpinned by a set of principles that need to be supported by a structure aligned to the internal and external environment of the organisation. Dynamic risk management principles are defined in this research based on literature and data received. These principles are (refer to section 5.2.1):

- Business facilitation – assists in improving the development of effective policies, standards, procedures and tools that will allow for sustainability as well as reconfiguration/ transformation;

- Internal and external environment context – understanding the internal and external environment of the organisation;

- inclusion - the appropriate and timely involvement of all stakeholders; and

- Integration - this implies the integration of risk management into all organisational activities and structures.

In addition to this and core to these principles is the agility and resilience of the organisation and/or risk function. These are embedded within the dynamic risk management framework and form the core principles for conducting dynamic risk management.

8.1.3. Sub-Question 3

SQ3 - What constitutes risk management in dynamic environments?

The design and implementation of a dynamic risk management framework considers the complexity of the environment in which an organisation operates, providing guidelines on implementation that are essential for a dynamic environment. For effective dynamic risk management, organisations and the risk fraternity need to realise the impact that fast-moving business environments (internal and external) has on the ability of the business to meet business objectives as well as maintain competitive advantage. Consequently, in this research, dynamic capabilities as well as agility attributes are mapped to the risk management process (refer to 5.2.3). Dynamic capability elements have then been defined and these are used as a measure through the assessment tool as to what would constitute dynamic risk management for an organisation. Dynamic capabilities aligned to organisational agility attributes can be used to determine how dynamic risk management can be conducted in organisations which operate in dynamic environments and have adopted dynamic risk management principles.

MQ: What are the elements of a framework that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment?

The dynamic risk management framework was developed consisting of four core dynamic risk management principles; namely, *internal and external context*, *inclusive*, and *business facilitation and integrate*. Apart from the principles, the elements defined within the framework are used for the measurement instrument which consists of a questionnaire.

The elements of the dynamic risk management framework consist of the dynamic capabilities and agility attributes. These are defined as being:
- -Sensing and Responsiveness;
- Seizing and Speed;

- Manage and potential need; and
- Transform and Flexibility.

These are defined within the dynamic risk management framework, as elements that a responsive organisation can use when wanting to apply more dynamic risk management principles in a dynamic environment.

8.2. Reflection

8.2.1. Personal Reflections

This section presents my personal reflections and experience in conducting this study.

The researcher has been fortunate to work in various organisations in her working life and has had the privilege of growing in her career in risk management. For the 17 years that the researcher has been in the profession she has been fortunate to see how the risk fraternity has grown and matured in its level of risk reporting but also how business has had a mind-set shift towards risk management. Risk is at times perceived as a tick-box exercise and business units at times only pay attention to their risk culture and profile when impacted from a business performance, reputational and operations perspective. This occurs when businesses start to lose their competitive advantage in the market, noncompliance with regulators requiring fines and penalties to be paid or when excessive losses are experienced due to weaknesses in the control environment. What has happened with the landscape change among organisations and the increased competitiveness is that risk is now being recognised and many organisations are seeking the support of risk from a strategic and operations perspective. The challenge however, is still how risk is performed and not knowing how to become more dynamic in practice.

It was with this in mind, together with my research interest in risk management that the researcher embarked on this study. The personal intentions of the researcher with this study were to develop a business tool that can be applied in an organisation and to build on the existing risk management literature.

8.2.2. Scientific Reflection

On completion of the literature study, there was evidence of a gap in the literature where more research is required about understanding what risk fraternities and organisations can implement as a way of work so as to ensure dynamic risk management practice. Furthermore, the literature on the current risk practices in responsive organisations indicated that current traditional risk practices may not be efficient. But how this can be overcome through practical risk approaches that facilitate business facilitation needs to be explored. The dynamic risk management framework developed consists of four components. The first component is the framework itself depicted by a graphic representation with all its elements including the principles. The second component contains the dynamic risk management elements identified across the risk assessment process. The third component is the assessment questionnaire and lastly the assessment outcomes which is the graphical representation of the assessment results, refer to figure 7-2.

This study contributed by developing a dynamic risk management framework with the aim to develop a dynamic risk management framework that will guide a responsive organisation to apply more dynamic risk management principles in a dynamic environment. As such, this study contributed to the scientific body of knowledge.

8.2.3. Research Process Reflection

Klein & Myers (1999) propose seven principles for interpretive field research, depicted in table 8-1. A set of principles for the conduct and evaluation of interpretive field research is proposed, along with their philosophical rationale. In this study these principles are looked at and the application of each principle is considered in terms of importance and relevance during the collection and interpretation of the data, as depicted in table 8-1.

Table 8-1 Reflection on how the principles of interpretive field research was applied. (Klein & Myers, 1999)

No.	Summary of principles for interpretive field research	Reflection on how the principles for interpretive field study was applied
1.	**The fundamental principle of the hermeneutic circle:** This principle is fundamental to all the other principles and suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form.	The first data set was received from the online questionnaire and analysed such that the initial framework was developed. The second data set was received during the evaluation phase by conducting semi-structured interviews. By analysing the data collected through these cycles, the researchers understanding of the study as a whole was established by referencing the individual parts. Gaining a more in-depth understanding of the study and sharing this with the interview participants during the evaluation phase. This enriched the understanding of each individual part by referencing the whole.
2.	**The principle of contextualisation**: Requires critical reflection of the social and historical background of the research setting so that the intended audience can see how the current situation under investigation emerged.	The survey conducted within the study allowed the researcher to obtain the views of the research participants in terms of traditional risk management, processes and principles applied across various organisations. From this process the initial dynamic risk management framework was developed. The semi-structured interviews that were held to evaluate the initial framework provided the researcher an opportunity to look at the framework in the context of existing and emerging risk management structures. Providing the researcher the opportunity to identify gaps within the framework that may impact the relevance of the framework.
3.	**The principle of interaction between the researchers and subjects:** Requires critical reflection on how the research materials were socially constructed through the interaction between the researcher and participants.	The survey that had been developed was tested during a pilot so as to develop the online questionnaire. The final version of the framework was developed after the evaluation phase. Semi-structured interviews were held to evaluate the initial framework developed in terms of dynamic risk management principles, the application of the framework developed and gaps within the framework and principles. Through the interaction with the research participants the final framework was constructed based on the views provided by the participants this resulted in the development of four components of the framework. Each of these components making a unique contribution to the overall framework and representing the tangible

No.	Summary of principles for interpretive field research	Reflection on how the principles for interpretive field study was applied
		outcomes of this study.
4.	**The principle of abstraction and generalisation:** Requires relating the idiographic details revealed by the data interpretation through the application of principles 1 and 2 to theoretical, general concepts that describe the nature of human understanding and social action.	Specific questions were asked in the survey and the interview, these were analysed to gain an in-depth understanding of the entire study. The views obtained from the research participants were used to develop the framework with the understanding of the context in which such framework would be applied and the value that would be derived. Based on the data received the assessment of dynamic capabilities and agility attributes are key if wanting to mature in dynamic risk management hence understanding this aspect was key in the conclusion reached for this study.
5.	**The principle of dialogical reasoning:** Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings with subsequent cycles of revision.	Contradicting views were particular on how traditional standards stated iterative as a principle but the risk management programme when applied is planned, systematic and methodical. In both the questionnaire and interview, view on the iterative nature of the existing and traditional risk management was expressed as well as on the systematic, methodical and systematic nature by which risk management is applied. This requiring constant referral to data and existing literature so as to determine what would constitute dynamic risk management from a principles and framework perspective.
6.	**The principle of multiple interpretations**: Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study.	Differences in opinions existed but was also expected because of the difference exposures of participants either because of work experience, the organisation type they worked for, their level of seniority and more so the fact that some were in the risk fraternity and other within business
7.	**The principle of suspicion:** Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants.	In both the questionnaire and interview, the research had to be aware of the fact that possible biases and distortion may exist within the data collected. The questionnaire used in the collection of data was send to both risk practitioners and business representatives. Understanding the impact that risk culture has on risk perception the researcher had to understand that there may be bias views from business with regards to risk management. This may mean that depending on the risk perception business may be harsh in what

No.	Summary of principles for interpretive field research	Reflection on how the principles for interpretive field study was applied
		they consider as value-adding and relevant from a risk management perspective. This may be driven mainly by the business representatives own experience with the risk community or even due to the limited understanding of what the risk function does and contributes to the business.

Reflecting on how these principles have been applied has assisted the researcher in this study to concentrate on applying an approach of analysis and interpretation that would assist the researcher to derive a research outcome that is more practical and relevant for the challenges faced within the risk fraternity and responsive organisations.

8.3. Limitations of Study and Future Research

Considering the change in organisational structures across industries and sectors and the increased competitiveness in the economic landscape, this research study looked at the development of a dynamic risk management framework and principles. An overview of the dynamic risk management framework is given in section 7.2., consisting of four components that provide a unique contribution to the overall framework and represent the tangible outcomes of this study.

The dynamic risk management framework was derived from data received during the survey (from both business representatives and risk practitioners from various organisational structures) and interview process. The sample size received during the study was from a South African base and considering that risk management is a global practise, further research is required to provide a more global context for dynamic risk management. Considering the limitations in sample size and possible biases, further research may be required so as to provide practical guidance on what processes and procedures responsive organisations can implement within their risk management programme.

The further development and testing of the tool which consists of a questionnaire should be considered for further research, also looking at how more real-time risk management can be performed in responsive organisations as this still remains unanswered. In addition to this, an area for further research is the consideration of risk types that responsive organisations would

inherently be more exposed to and developing a way of work that would assist in the continuous assessment of these risk types. What would assist also is the development a of dynamic risk taxonomy as a guide to how to address these risks types.

8.4. Closing

This study has shown that risk management needs to be at the forefront when referring to organisational agility and organisation dynamic capabilities. Organisations and risk functions should work together to understand what impacts their level of agility or what impacts them in building their dynamic capabilities as this has a direct impact on organisational transformation and growth. Tools and techniques are ways in which organisations can continuously apply proactive measures to understand their maturity levels so as to ensure that business goals and objectives are achieved, even in continuously changing environments.

The dynamic risk management framework and principles developed within this research study is such a tool and by applying the framework, continuous assessment of the level of maturity can be implemented.

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Appendix A: Online Questionnaire

A.1. Introduction

The online questionnaire developed consisted of seven sections namely: introduction and consent, participant function and organisational demographics, risk management framework, risk management principles, risk management process, traditional vs. dynamic risk management and end of survey (Appendix A: A-2). The survey was designed so as to collect both quantitative and qualitative feedback from the research participants. The survey questions required participants to select responses from 15 questions that were designed to be either 'yes' or 'no', free text, drop down list, multiple choice, checkboxes and rating scales.

A.2. Survey design

Section 1: Introduction and consent	
Key Elements	Introduction of the researcher
	Invitation to potential research participants to participate
	Purpose of the research
	Confirmation to participant on the anonymous nature of research
	Estimated time to complete
	Researcher details
	Study leader details

Section 2: Participants function and organisational demographics			
Research question #	Research question	Question Type	Comment
1	Please indicate that you have: - Read and understood the information provided above You give your consent to participate in the study on a voluntary basis	Yes / No	Skip logic had been applied to the question. If a participant answered no, then the survey would skip to the end of the survey.
2	Which of the following best describe your job function?	Drop down list	Include a single line of text for 'Other' job function
3	How many years have you been working?	Drop down list	Years ranged from <5years to 40 years and above
4	What job level are you at?	Drop down list	List started from graduate to executive / director level
5	What type of organisation or organisational structure do you work for?	Multiple choice	

Section 3: Risk Management Framework			
Research question #	Research question and sub questions.	Question type	Comment
6	Which frameworks are you familiar with? Select all relevant responses.	Checkboxes	
7	Please answer the following based on your organisation's risk management framework.	Matrix / Rating Scale	Rating scale: Strongly Disagree (1) / Disagree (2) / Neutral (3) / Agree (4) / Strongly Agree (5)
	The organisation's risk management frameworks assist the organisation to integrate risk management within its overall		

	risk management system.		
	The organisation's risk management frameworks consider both the external and internal context of the organisation. .		
	We periodically review our risk management policy and frameworks in response to changes. .		
	The organisation ensures that the framework for managing risk continue to remain appropriate.		
	Accountability for developing, implementing and maintaining the framework has been assigned.		
	Key components of the risk management framework, and subsequent modifications are communicated appropriately.		
	There is adequate internal reporting on the framework, its effectiveness and the outcomes.		

Section 4: Risk management principles.			
Research question #	Research question and sub questions	Question type	Comment
8	Please complete the following questions with reference to your risk department.	Matrix / Rating Scale	Rating scale: Strongly Disagree (1) / Disagree (2) / Neutral (3) / Agree (4) / Strongly Agree (5)
	Risk creates value.		
	Risk management is about diversity in skills and expertise.		
	Risk management is an integral part of organisational processes.		

	Risk management is part of decision making.		
	Risk management practices are systematic, planned and structured.		
	Risk management is tailored to the organisation's business areas.		
	Risk management is aligned with the organisation's external and internal environment.		
	Risk management is transparent and inclusive of business.		
	Risk management facilitates continual improvement and enhancement of the organisation.		

Section 5: Risk management process.			
Research question #	Research question and sub questions.	Question type	Comment
9	Think about your ways of work and consider the risk management process in your risk department, then select the most appropriate answer from the statements below.	Matrix / Rating Scale	Rating scale: Strongly Disagree (1) / Disagree (2) / Neutral (3) / Agree (4) / Strongly Agree (5)
	There is continuous communication and consultation with business by risk management.		
	Brainstorming sessions are held with relevant stakeholders where all conceivable risks are itemized.		
	Only risk management is responsible for the monitoring and reviewing of risk.		
	When risks have been defined the risk fraternity together with business are responsible for the planning of contingency.		
	Both business and the risk fraternity are		

	responsible for implementing the desired controls.		
	Risk is measured by also considering the speed at which one can respond to a risk (velocity).		
	Risk management is about satisfying the customer through early and continuous identification and resolution of risks.		
10	In your own words, what are the challenges currently faced when conducting risk assessments?	Free text (Single text box)	

Section 6: Traditional vs. Dynamic risk management			
Research question #	Research question and sub questions.	Question type	Comment
11	How would you describe dynamic risk management? Select all relevant responses.	Checkbox	List of characteristics
	Any other way you would describe dynamic risk management?	Free text (single text box)	
12	What benefit do you think the change to more dynamic risk management framework, principle and practice would bring to the organisation?	Free text (Comment box)	
13	If you had to design a dynamic risk management framework, how would you answer the statements below?	Matrix / Rating Scale	Rating scale: Strongly Disagree (1) / Disagree (2) / Neutral (3) / Agree (4) / Strongly Agree (5)
	Dynamic risk management is iterative and responsive to change.		
	Dynamic risk management should only consider key drivers and trends impacting on the organisation's objectives.		
	Dynamic risk management effectiveness depends upon both agility and resilience.		

	Dynamic risk management practices should be transformed to cater for the changing organisation.		
	Risks should be reported as and when they are identified to business.		
	Risk indicators to be tracked and monitored should be directly aligned with the business performance indicators.		
14	Considering all answers above, how would you transform your current risk management process to be more dynamic?	Free text (single text)	

Section 7: End of Survey			
Thank you for taking your time to complete the survey			
Research question #	Research question and sub questions.	Question type	Comment
15	Please provide me with potential participants by typing their email addresses.	Free text (single text box)	

A.3. Online questionnaire pilot

The success or failure of the online questionnaire has consequences for the successful completion of the study which impact on the successful development of the dynamic risk management framework. Prior to conducting the online questionnaire, a pilot was conducted so as to ensure that the online questionnaire was easy to use and understand. The following review elements were considering during the pilot namely:

- Time to complete;
- The use of plain language;
- Questions are simple and to the point; and
- Survey look and feel.

Seven individuals were selected to form part of the pilot. These individuals were selected based on their job function, expertise in research design and level of expertise.

Pilot participants 1:

Table 4-4a: Pilot participant 1 responses

Review Elements	Comments
Time to complete	10 minutes - but I did not really complete the open-ended questions - so it might take longer for real respondents
The use of plain language	Good
Questions are simple and to the points	Yes
Survey look and feel	Nice
General Comments	1) In questions 6: I assume respondents will understand what you mean with those different types of organisations - or do you need to define it somewhere? 2) Question 8) - do you mean what aspects/factors? 3) Question 9: What other values are key within risk (should you add management to the word risk - i.e. risk management. 4) word omitted - both business and the risk fraternity are responsible

Pilot participants 2:

Table 4-4b: Pilot participant 2 responses

Review Elements	Comments
Time to complete	It took me 10 minutes to complete the actual survey, reading and understanding all aspects and completing it with real answers
The use of plain language	The language was easy to understand and I feel it was aligned to business language that potential participants will understand

Questions are simple and to the points	The header that guides you to answer the questions are key and provided the context for the questions that was formulate in an easily understandable way.
Survey look and feel	The survey looks neat and tidy and gives you progress as you complete questions. Professional look and feel.
General Comments	On the recommendation (last question) I would suggest that you ask for the email address or cell phone number of the nominee. It will be difficult to contact people if you do not have such details.

Pilot participants 3:

Table 4-4c: Pilot participant 3 responses

Review Elements	Comments
Time to complete	11min
The use of plain language	The questions are easy to read and understand.
Questions are simple and to the point	Q8 would require a bit more thinking for people who are not within familiar with risk management. Provide examples of elements of risk management. I took long completing this question because I had to remind myself of elements of risk management.
Survey look and feel	The survey is easy on the eye. There is no information overload.
General Comments	The overall survey was good and provided some interesting insight

Pilot participants 4:

Table 4-4d: Pilot participant 4 responses

Review Elements	Comments
Time to complete	13 minutes – could have been less… (see general comments)
The use of plain language	Well done…No struggles J
Questions are simple and to the point	Yep
Survey look and feel	Look and feel is perfect.
General Comments	**Question 5** Are we assuming that all your participants understand the terms used? I used up few more seconds on this question and then I wanted to go back to it just to be sure…There's no going back. I am just worried that if participants are not sure of the meaning of these terms it might skew your results because we might just assume and click whichever one we want without really understanding what it means. **Question 16** Wasn't sure what to give you…just name or surname, email address, contact number?

Pilot participants 5:

Table 4-4e: Pilot participant 5 responses

Review Elements	Comments
Time to complete	10 minutes
The use of plain language	Good
Questions are simple and to the point	Yes
Survey look and feel	Looks nice
General Comments	6 – Will people understand what you mean with the organisational structures if you have not defined them?

Pilot participants 6:

Table 4-4f: Pilot participant 6 responses

Review Elements	Comments
Time to complete	13 minutes
The use of plain language	Well done
Questions are simple and to the point	Yep
Survey look and feel	Look and feel is perfect.
General Comments	Question 4 Are we assuming that all your participants understand the terms

	used?
	Question 15
	Maybe drop down? (Yes, No, Not Sure)
	OK button… sometimes it seemed misplaced…does it mean I cannot go next if I didn't click on it? (Not too concerned, just thought I should mention it)

A.4. Online questionnaire data results

Respondents	Q8: What other values would you say are key within risk management, particularly in a changing environment?
1	It is imperative that management and staff are educated on what risk management is and what to look out for as well as how their decision making will be impacted as a result. Regular up-dates to staff on risk management are imperative and must be done regularly.
2	communication, agility, reliable, fit for purpose
3	The ability to understand the business and its levers and then be able to apply those. Helping business to solve for risks and not adopting hands off approach. This is possible regardless of the first and second line
4	Transparency
5	forward looking assessment of risk
6	Keep abreast of all changes and act quickly.
7	Positive disciplines - scanning for opportunities over and above avoiding risk.
8	Innovation with specific reference to risk associated with digital working environment.
9	Risk Management is not playing the role it should in our space however I'm not sure why
10	Flexible standards depending on size and maturity of an initiative

11	n/a
12	None
13	change management, IT project risk management
14	Na
15	Values that should be adopted for risk is flexibly and a culture of continuous learning. The frameworks tend to be rigid and reactive rather than proactive to the rate of change
16	Flexibility in the light of technological change and the need to experiment under uncertainty, with the potential for negative outcomes
17	Flexibility in the light of technological change and the need to experiment under uncertainty, with the potential for negative outcomes
18	Risk frameworks and mitigation strategies are aligned to support Organisations strategic and delivery objectives
19	Transparency
20	Part of the journey not just decision making
21	Assisting the business to understand the level of risk it is taking on instead of only looking at the upside during planning
22	integrity, objectivity
23	Needs to be strongly aligned to the Org culture
24	It is key to remain in pace with the business so agility of the framework and its application, as well as staying abreast of business changes are important.
25	Creating a controlled environment.

Q10: **In your own words, what are the challenges currently faced when conducting risk assessments?**	
Answered	**125**
Skipped	**58**
Respondents	**Responses**
1	There is no way in which risk is done that is in support of the way in which we work
2	Risk is removed from what the business is focused on because they do not do what business is doing

	3	Risk assessments cover that that is not important to business
	4	Risks are the only people that know what they are doing. Risk always comes when we are done with projects and raise issues with no solutions
	5	Availability of relevant people. Some relevant persons are not knowledgeable
	6	The amount of time it takes management vs other deliverables
	7	The risk assessment is done as some separate process to business as usual and managers don't think about it to the extent that they should as a result it becomes a tick box exercise at the point it is done. It is rarely part of the decision making process in every business unit.
	8	We don't do risk assessments
	9	Understanding from individuals may be a challenge. Sometimes there is a requirement to read a stack of documentation on risk and people do not like doing that.
	10	No formal process that is communicated across the organisation. Different business units go about it in different approaches and does not feed into overall organisational risk framework
	11	Finding the time to engage all stakeholders regularly to provide feedback
	12	lack of business buy in and co-operation
	13	Capacity, both from risk management and the appropriate individuals in the business
	14	None
	15	Often there is limited alignment and understanding risk assessment. Its purpose in relation to the business. There is often no clear management of outcomes and communication thereof.
	16	Access to information
	17	Big divide between risk and business. Not always working as partners
	18	Availability of timely, accurate and complete data.
	19	I do not conduct risk assessments
	20	Consistency and transparency.
	21	Verifying certain information with external parties, e.g. banks, home affairs, etc.

22	Scope of the review is not always agreed upfront
23	quality of data and assessment frequency
24	n/a
25	Time constraints
26	lack of accountability
27	N/A
28	Lack of collaboration
29	There is minimal risk management in our organisation. This is a huge concern, hence the responses.
30	Focusing on the Real Risks that need mitigation.
31	Subjectivity/bias in assessing the effectiveness of controls
32	Systems are implemented prematurely without the necessary controls in place.
33	Individual expertise and views are not always considered
34	Lack of controls, process, systems and skilled officials to perform Risk Management
35	Communication and understanding is not consistent throughout the organisation.
36	Risk assessments are viewed as the sole responsibility of the risk fraternity
37	Knowledge and understanding of what is required
38	Risk professionals tend to teach risk concepts rather that explaining risk in the context of the job / function being performed.
39	Risk never understand what we are working on and why, they are also very late.
40	The involvement of risk at the right time
41	stakeholder buy in and ownership
42	N/A
43	Subjectivity of control effectiveness
44	Reluctance by responsible personnel to accept risk assessment within their own job function.
45	Risk is not visible

46	Risks need to be reported much quicker and more specialized people should be working in risk.
47	Risk assessments are not realistic in that they are always late and not on time. In an agile environment risk is very reactive and creates no value for us
48	We never have continuous engagement with risk as a result I think that risk is quite removed from what we do.
49	Business still regards risk assessment as a red tape activity and does not see it as a pro-active activity to manage one's risks
50	People not adhering to risk processes because processes are either NOT clearly defined or are not available.
51	Management is responsible for implementing the controls to mitigate risks. Risk management need to be exercised by each and every manager not sole responsibility for risk team. Risk team provide the necessary guidelines and wisdom to manage risk but cannot do management's work. The Culture in Organisations may be a challenge.
52	Risk assessments are done retrospective without assessing future impact. It mostly focuses on uncontrollable risks rather than action plans to address controllable risks.
53	There is no uniform approach in CES to conduct risk assessments....although this is incorporated into the way of work for projects, it's not part our business practices and culture
54	Ownership to risks identified, risks shared by more than one owner
55	no defined risk management structures
56	Getting buy-in from business
57	Risk assessments are time consuming and very often accompanied by a vast number of templates to complete. Risk assessments reporting should be fed back into the business systems as soon as possible to create responsive changes to risk rather than quarterly reviews and reporting
58	Lack of understanding and appreciation for Risk management. The inability to address risks end to end ensuring that the residual risks are reduced as much as possible

	59	Stakeholder buy-in to value, organisational maturity, culture
	60	Not having adequate information.
	61	the time it takes to document and keep records and follow on
	62	N/A
	63	Lack of business involvement
	64	Business needs to be consulted and be risk managers in themselves
	65	Participation/ inclusion of Group risk in decision making process in some departments
	66	Lack of continuity (and therefore deep understanding) from business resources
	67	Limited understanding of the business by the risk team when they are not part of the business or close to the business
	68	Appropriate commitment by management to implement the management actions agreed on findings.
	69	It's too much of a tick box exercise
	70	*
	71	I am not close enough to the process to comment on this.
	72	Risk and Incidents are 2 separate things
	73	There is no issues
	74	N/A
	75	Transparency to the rest of the business
	76	Knowledge of risk at business owner level and staff turn-around in risk teams
	77	Complex, involved RCSA methodology which is quite time consuming.
	78	Appropriate linking to business needs and decisions is difficult. Also providing risk information quickly enough to form part of business decision making. Ensuring a constructive engagement with business.
	79	Starting from just understanding risk management in our organisation is a challenge. We do have all processes and frameworks in place BUT following it though is a challenge. My take, it is just treated as a tick box exercise and not and something necessary and required to be done for the organisation to survive. We do risk assessment when we know auditors

	are about to know on our door.
80	n/a
81	transparency
82	Quality of the assessment
83	People not prioritising that risk that are poorly mitigated
84	Risk evolving into a business enabler rather than a function that is perceived as stalling them. Risk processes and frameworks are not aligned to the pace of change that the business units face. Additionally, training of Risk Practitioners on new technologies, processes and org culture is not prioritised hence business views Risk as being out of touch.
85	Commitment from all the relevant role-players to take the time and engage with the risk or compliance officer to conduct the risk assessments. Business doesn't take accountability and ownership of what their role is in the risk process.
86	Making it applicable to the most significant business risks
87	n/a
88	Lack of nuanced understanding of the rapidly changing business realities and urgent need to search for alternative approaches as a result of rapid changes in technology.
89	Often there is a lack of understanding of emerging business practices and business models and that learning is not possible without experimentation and the *likelihood* of the occasional negative outcomes/failures.
90	The ability to adapt an institutional risk framework for an innovations environment, i.e. using a one size fits all approach
91	Risk management tools are not designed for an agile environment
92	Poor level of risk understanding and mitigation through design, particularly in the new iRPA domain relating to TCO and ERP leveraging
93	The stakeholders of risk do not take accountability.

94	Engagement with business
95	Lack of co-operation
96	Risk assessment is usually a tick-box exercise especially in big corporates
97	Parties required for input not forth coming with critical details
98	A culture where department heads are open about risks they're exposed to
99	Not clear visibility of risk mitigation follow-trough to resolution
100	Lack of knowledge by the general work force
101	Business Support and The attitude of business toward risk management
102	Risks not being raised. Risks incorrectly defined which makes it difficult to track.
103	Speed of Novelty and Environment changes; Skills needed to follow up on Risks migrations
104	Understanding of the Scope, Impact, Ownership and simple communication across an Enterprise plus the potential interlock with Service Providers and Clients. Basically end-to-end value/supply chain.
105	Velocity - Speed to execution
106	Not applicable to my function
107	Risk is not a function or practice that is widely accepted by the business and at times business does not want business in their business.
108	There needs to be more involvement of Risk Management in all operational meetings between business and relevant stakeholders. Risk Management therefore needs to be imbedded in business. By doing that, we can ensure more effective Risk Management through developing a more efficient risk culture.
109	Co-operation between key stakeholders
110	The business universe for which area is responsible. Roles are not clarified enough.
111	Risk assessments are done as a tick-box exercise and are not fully integrated into the day-to-day business
112	Business/management understanding their role (responsibility and accountability)

113	Not enough business participation.
114	.
115	n/a
116	COMMUNICATION AND KNOWING THE PROPER CHANNELS
117	Not understanding the business case and objectives because it is not always clearly defined.
118	Business often uses "agile" to circumvent addressing risks appropriately.
119	Time and availabity of resources.
120	Business goals and priorities
121	Lack of assistance from business and resources
122	It's getting to give answers to people who never come back with solutions but only giving findings that are negative.
123	A big issue is to get time in executive managements' calendars and to balance business prerogatives with the very internally focused risk team calendar. The risks are sometimes very "esoteric" and not very practical - especially at a strategic level. It is sometimes difficult to convince risk team members of business practicality in this regards.
124	Receiving information that either isn't clear or correct
125	Turnaround time in completing assessments and gathering adequate information that reflects the true state of the organization.

Q11: Any other way you would describe dynamic risk management?	
Respondents	**Responses**
1	I do not work in risk management, so I won't be a good person to get feedback from. Sorry.
2	N/a
3	Flying by the seat of your pants sometimes necessary; trust your instincts
4	Risk should only deal with the risks that matter for the business at that point in time, do risk in small chunks
5	Not only the mitigation of risk, but the identification of opportunities to exploit i.e. risks we are able to manage that our competitors are struggling with, and exploit this to gain advantage.

	6	Actively and creatively use data and analytics
	7	Na
	8	Integrated into Enterprise design at all levels with domain specific iterations
	9	Refers to a situation where the risk position being hedged experiences frequent changes
	10	Adapting industry wide standards (ISO 31000 et al) to specific business context
	11	open communication channels to risk across the business
	12	I would like to see more risk dashboards, available to all staff, not just the risk fraternity.
	13	Risk decisions should be make at the source, and should be agile as business strategies change
	14	Risk management should be at the forefront with business stakeholders and business innovation. They should assist with determining risks for future ventures and be part of the process to mitigate those towards successful implementation and roll out of these ventures.

Q12: **What benefit do you think the change to more dynamic risk management framework, principles and practices would bring to the organisation?**		
Answered	**118**	
Skipped	**65**	
Respondents		**Responses**
	1	Risk would be more responsive and maybe able to better support business in identifying risks and opportunities
	2	Risks would be identified and resolved much quicker
	3	Risk would be able to add value by being more integrated with business because then they would be operating as partners and not like one is the police.
	4	Risks would be picked up quicker

5	Business would be able to handle issues quicker and risk would be able to support business in decision making
6	It will limit losses and reckless decisions
7	Can support an Agile organisation
8	Enhanced profitability as a result of pro-active risk management at all levels.
9	It can actually add value
10	Increase security and costs.
11	unified approach to risk identification, escalation and resolution regular review of identified risks by all stakeholders from different business units proper communication process in place correct way of identifying the risk owners proper timeline allocated to risk escalation and resolution
12	Ability to react quicker should new risk be discovered or realised.
13	proactive as opposed to reactive mitigation of risks
14	Timeous risk management to influence decision making in a dynamic business environment.
15	Risk will become part of business currently can be viewed as a process conducted to force find risks that in the bigger scheme of things are detracting from the real conversations to move the business forward. we need to view things as opportunities to be better but talking about things as a risk it narrows the mind in ways to find solutions
16	Quicker response to risks
17	A more empowered risk management fraternity that can provide assistance to business in solving for challenges. less reactive
18	Risk management will become more appropriate and aligned with the underlying business environment, ability to respond to changes in this environment.
19	A better risk culture
20	More holistic and efficient reporting.
21	It will serve as a huge deterrent.
22	relevant risk insights that enables timely decisions

23	It would enable business and risk managers to identify risks in a more timely manner
24	Better responsive time to the risk applicable to the business
25	Same as above.
26	More involvement by all the impacted stakeholders within the organisation
27	This will bring about a real understanding of where the issues could reside, rather than looking at process and trying to find risks.
28	Proactive risk management, risk management embedded in business processes and decision making
29	We would be more responsive earlier on. This should minimize our potential risk and losses.
30	Business continuity and avoid loss of revenue
31	Improve business efficiency and value for money on clients; Promote work ethic, integrity and efficiency;
32	Increased agility
33	It will result in more proactive risk management and it will inculcate risk management in the day to day activities of the business.
34	Ethics and Compliance
35	Risk Maturity
36	Risk would be able to add more value. Always be involved in key business initiatives and do more than just identify threats but also opportunities
37	Risk needs to be involved all the time and should be more aware of what is happening in the business.
38	Timely risk reporting
39	Quicker identification of risks and more involvement by business and risk in resolving risks
40	swift response and action implementation capitalizing on risks as opportunities
41	Trust, more open communication and honesty among relevant stake holders and players in the field.
42	This will enable business to make good decision based on the risks and inform the investments required to ensure compliance and alignment to business

		objectives. Business losses can be properly managed, and risk can be proactively managed
	43	Risk should be more visible to the business so that they may know what is happening and then work on what matters to the business
	44	Risks would be identified quicker and controls implemented much quicker
	45	We would be able to implement solutions with clear consideration of risk
	46	We would have more engagement where we feel that risk is part of us and not just there.
	47	A more proactive and streamlined organisation. Minimal risks to the organisation and "On Time" delivery of projects thus saving the organisation huge costs on mitigation processes that don't really work.
	48	Better speed of service; better teamwork and collaboration
	49	It will assist the Risk team to be Agile and Proactive.
	50	More agility and quicker response times. It should also lead to more relevant results that should enable business to derive action plans to address the risk as soon as possible.
	51	More visibility of Risk Management collaboration with business and tangible, valuable and relevant impacts
	52	A clear direction towards smooth business
	53	reducing risks in an ever changing environment
	54	Seamless integration of risk controls seen as a benefit and not just something that has to be done.
	55	Speed of implementation Upfront investigations real time monitoring of risks responsive changes where required client and stakeholder trust
	56	The opportunity to respond to market demands and keep pace with competitors in an area like digital product and service offerings, ultimately leading to increased market share, customer satisfaction, and trust.
	57	Risk will be identified sooner and appropriate action will be taken to

		minimise the risk.
	58	it will ensure that we keep risk top of mind and are agile enough to adapt / mitigate continually
	59	Business would be more responsive and inclusive
	60	It will allow business to realise the importance and value of risk management in decision making.
	61	Risk would be able to provide more value and really be part of the business decision making processes
	62	Safeguard the company
	63	Sustainability of the business brings focus and perspective as well as proactive management of both internal and external risks proactively rather than reactive.
	64	Aligns with more Agile business "way of work". Appropriate for the rapidly changing environment we are in.
	65	Early detection and rapid resolution of risks.
	66	Ensure that controls are incorporated sooner
	67	It would allow for continuous improvements on a timely basis. Also reducing the risk of a bigger impact on the business.
	68	NA
	69	Value add for proper planning for the uncertainty
	70	This would allow for the early identification of risks, which will help to ensure that the correct actions are taken when required. It will help to ensure that business has all the relevant information at hand when making decisions and can therefore make better informed decisions.
	71	It will enable the organisation to implement strategies and products by limiting risks, therefore quicker implementation and reduction in rework. Also would limit the reputational and actual risk of a company
	72	Forward looking views that aid (not impeding in any way) the success of the business.
	73	More buy-in from business. Easier to integrate risk management into the business processes. More efficient use of resources.

74	We will be aware/awake about of the risks around us and even better mitigate them
75	n/a
76	everyone working together in driving risk management
77	Value
78	Early identification of risk and a more proactive approach that reactive
79	Value-based risk assessment, prioritisation and mitigating controls
80	Proactive risk management. Business and risk functions work better as a team. accountability and teamwork
81	It incorporates risk management as part of business and not a process in parallel with business.
82	Collaboration
83	It would help to make the organisation more agile and evolve its risk appetite and approach in a direction that is more appropriate, given the rapid pace of change in business today, principally as a result of technology innovation and the challenges to existing business and operating models.
84	It would add a great deal of value relative to shorter and more agile timeframes and approaches
85	Clearer value add
86	Significant impact on TCO - efficiency and effectiveness is a design consideration whether strategic or operational and particularly relevant to org interaction
87	It would bring more people with different perspectives that understand business together. This will allow a broader framework to be determined.
88	Potential threats could be identified before they have a negative impact on the organisation.
89	Pro-actively minimise risks
90	Agility and pro-activeness
91	Focusing on what matters at any given point in time
92	It should help the organisation critique its strategic and operational frameworks

93	Effective and responsive resolution to risks
94	I think once business embraces risk as a function holistically, great change and value could be created.
95	Lowering of operational expenses.
96	Alignment with business needs & changes
97	Adaptability and Predictability will increase.
98	Uncertain as the marketplace does not fully understand the impact it has on them and their businesses
99	Speed to execution Clear vision of what needs to happen
100	More business and risk collaboration as well as the early detection and resolution of risks by both business and risk
101	I think that we would be able to embed a more effective and efficient risk culture within the organisation.
102	Not sure
103	To have a pro-active forward-looking view of risks and addressing the risk before it actually materialise.
104	Earlier response to changing risks faced resulting in reducing the adverse effects of the risks; and Making risk management everyone's business and not only the risk team's responsibility.
105	Profit hearing and providing client needs quickly
106	Currently the wheels turn slowly. I'd like to see a more agile approach, and faster turnaround. The world is moving faster today than 10 years ago.
107	.
108	Holistic and clearer combined assurance. Proactive risk management.
109	SECURITY AND JOB SATISFACTION
110	Faster execution on development, embedding of controls and will impact positive on time to market
111	would provide management with visibility of the impact of risks on our

	bottom line
112	Prompt response to risk management, proactive risk management, flexible.
113	Quicker decision making, Governance process are built into you culture and execution and implementation of strategy.
114	You will manage risk more effectively and business will be more aware and see the value
115	Getting the team to be part of the risk management rather than involving the rest of the team at certain times.
116	Risk would not just be based on the existing business, but also focused on disruptive, digital and innovative business ventures.
117	There would be more innovative plans and solutions that could benefit the organisation
118	The organisation would be able to quickly respond to issues arising and provide better key risk controls that would enhance the value of the organisation.

Q13: What other elements would you say need to be incorporated within a dynamic risk management approach?	
Respondents	Responses
1	Management buy-in
2	Rewards must be offered to the most effective department that implements the risk management system to encourage compliance. Risk management must be incorporated in performance goals.
3	Effectively communicated
4	N/A
5	N/a
6	Flexibility to act immediately when risk profiles are identified
7	Before risks are identified and reported, a validation process should take place to confirm the nature of the impact on the organisation.
8	make reporting and acknowledgement of risks more seamless - e.g. standing point on all reports
9	More collaborative relationship between Risk and Business. Risk people

	directly involved in Agile teams where possible.	
10	Approach	
11	Risk management framework should not only look at what the business is doing, but take a look at what the business is not doing or taking seriously enough.	
12	Dynamic risk approaches for different operations, i.e. more tolerance for innovation and digital aspects	
13	High focus to be placed on change and transformation involving people capital as it relates to socio-political changes	
14	Accountability	
15	effective communication across the business	
16	Risk culture should be driven across the organisation	
17	Agile risk management processes e.g. make risk practitioners part of project teams so that you are not always on the back foot as far as risk management goes.	

Q14: Considering all the answers above, how would you transform your current risk management process to be more dynamic?	
Answered	**118**
Skipped	**65**
Respondents	**Responses**
1	Embed into business
2	Risks should better understand agile and develop an approach that would allow them to be there where it matters or at least to assist in the perception of risk
3	Risk should be removed as a shared service function and it must exist within the business
4	Risk should move into the business units so that they may add more value
5	I would ensue that risk is embedded in the business
6	Training
7	Management buy-in

8	Regular up-date of the risk management to all levels of staff so that this is embedded in the culture of the business.	
9	Integrate it into business and not have a centralised function completely removed from business	
10	For each project in planning and in implementation to continuously review identified risks, identify new ones. Ensure that there are mitigation plans and contingencies in place as required.	
11	review the current approach, framework and process and ensure buy-in from all stakeholders	
12	Setup internal channels to communicate existing and new risk; engage stakeholders in the business more regularly; educate on risk principles and benefits to the business.	
13	a more practical and less theoretical process	
14	The practical execution of a more dynamic risk management process will have to be considered in more detail	
15	none	
16	Better communication	
17	Business and risk to work more closely. Risk to get a better understand of the business, it's levers etc.	
18	Deploy technology and other solutions to update current risk management processes to become more agile, adaptive to changing environments, move closer to real-time assessment and monitoring.	
19	Neutral	
20	n/a	
21	Ensure staff are CFE compliant	
22	embedding of data analytics across processes, systems etc.	
23	Ongoing engagement with management	
24	Ongoing and open communication	
25	N/A	
26	The identified risks should be closely monitored and managed and ensure that all impacted parties are involved	
27	Ask the business what are the critical risks, rather than a ticking the box	

	process.
28	More proactive
29	Have a central repository to record all risk and have a feedback loop where outcomes could be tracked. GRC is a good example.
30	Regular reporting and assessment of risks identified
31	Implementing a user friendly system that incorporates all the business units and that reports any risk outside the processes covered
32	Embed risk management practices into business processes - especially for all change initiatives.
33	Report risks as and when identified. Risk should be more iterative and responsive to change
34	Risk indicators must be directly aligned with the business performance indicators
35	introduce continuous risk assessments
36	Risk would be embedded within business
37	Inclusiveness of different expertise and continuous focus on gain an understanding of the business since it continuous to change
38	Less formal reporting and more instant risk reporting so that it makes sense to the business
39	I would consider business and risk being partners in implementing controls
40	yes-change is always good
41	More inclusivity of all staff/stakeholders, dynamic approach to each identified risk and less conformity to the usual way of dealing with risks.
42	Formalise risk management framework, and ensure proper management of risks to ensure that business objectives are supported.
43	I would make sure that risk reports into business
44	Risk should be working in the business and we need to be reporting on risks as and when they happen
45	I would have risk as part of the squads and work on a culture of risk management within the business so that everyone considers risks when they work
46	I would have risk embedded in the business

47	Implement all of the above-mentioned processes
48	Ensuring better business buy-in; fit for purpose risk management; business specific risk management requirements
49	Yes
50	The most important element should be continuous engage and share information with business with a primary objective of reporting on risks that affect the objectives of the business.
51	By doing all the ideal things that represent dynamic risk management
52	Constant engagements to identify progress
53	first to understand the risk appetite, then design it
54	Collaboration with business
55	Include risk management in the project phase as a stakeholder, ensure agile risk monitoring and reporting
56	Embed it into day to day practices, shift part of the accountability for risk management to line 1 management to process owners, ensure risk management practices, controls, reports, behaviours etc. are built into the design and execution of the process. Risk management is not an "after the event" discipline!
57	Have a team focused solely on risk management.
58	simply by bringing it into daily conversations and practices
59	By being more responsive to change
60	Creation of an enterprise-wide approach to risk as well as diverting from the traditional approach of risk management to one that is consistent with the ever changing environment.
61	Embed risk within business
62	Obtain input from all applicable stakeholders from top to end
63	Risk to be represented at executive level as a focus
64	Start by seconding a courageous Risk person to a very dynamic business area and learn from there.
65	Intensify monitoring activities.
66	Have risk resources as part of the business operations

67	Allow for an iterative process in order to make changes in an agile manner. Making improvements on a continuous basis will allow for risk to be more easily averted leaving more room for general overall business improvements.
68	yes
69	By knowing that there is a value add in business
70	N/A
71	by incorporating all risks as part of business as usual
72	Yes
73	Specify business performance indicators and risk measures in an integrated fashion to ensure alignment. Focus on effective, more frequent reporting of a lower volume of information that focuses on key areas.
74	There must be ways to continuously assess the risk and be on our eyes every day. Let's not make it a once off exercise
75	N/A
76	Brainstorming risk strategy ideas
77	Team
78	I would get the extended management involved
79	Risk processes would need to be aligned to the agile processes that business is adopting in order for risks to be relevant and of value
80	Review all risk and compliance officer qualifications and experience and make sure that we have the necessary skills in these functions.
81	Being more agile and resilient
82	Teach business to have a risk management "hat", so that it is not merely a "pull" for information but that business will learn to proactively identify risks.
83	Bring in people and advisors from diverse backgrounds and experience that are deeply familiar with how business is evolving in the 21st century.
84	Have a different process for innovation and digital initiatives with a very strategic input
85	Get more cross functional teams involved; closer business alignment by being part of the agile journey

86	Use outside experts to drive design and supplement with internalized domain competence. It leverages wider experience frameworks and counters the risk of entrenched (boxed-in thinking). Source experience and competence and do not fall into the qualification trap. Overly structured and aligned (template) consideration of risk leads to distortion based on "best practice" and compliance to risk religion creates false security om paper. There is no box to tick for risk....
87	Yes.
88	Initiate regular engagement with Compliance
89	Yes
90	Real-time dashboards for risk management
91	Already is
92	Translate risk management into daily language to improve stakeholder understanding/participation
93	More transparent communication will enhance effective tracking and resolution of risks
94	Enhance systems and risk management skill
95	Not able to - not involved and lack expertise
96	Encourage a culture of highlighting risks and register those as soon as they are identified
97	Through Training/ Skilled Personnel AND continuous engagement in the organisation
98	Scrap and start again with a robust plan
99	Involve more players in the process
100	I would embed risk within business and make sure that business performance is measured on risk management
101	We need to be embedded in business, we need to be able to adapt with business as and when the market environment changes and we need to focus less on reporting being our primary function.
102	Not part of my job role
103	Reporting risks as and when identified. Furthermore to adjust monitoring plans for the needs identified as the business and external environment

	change.
104	Provide basic training for everyone on risk management; and Make risk management part of everyone's performance objectives.
105	improve communication channels
106	I would do away with only quarterly reporting, and more regular but smaller reports.
107	.
108	More training, transparency, leadership and greater understanding of MMI's risk vision and methodology.
109	BRING RISK CONCEPTS CLOSER TO THE PEOPLE
110	An independent but decentralise functionality
111	more frequent engagement
112	Iterative and responsive to change.
113	A culture and behavioural change
114	don't know
115	Risk should be embedded in the business as a whole.
116	I would decentralize some capability into the business units with oversight from a central perspective. I would optimize the risk management processes to be aligned to the pace of the business and align reporting specific to what business objectives must be achieved.
117	Allow more freedom within the process, so that it may not be stagnated during crucial periods
118	Creating risk management awareness to the entire organization through workshops and ensuring that it is embedded within the everyday operations of the organization. This will ensure that business will easily pick up issues and report them straight to risk department.

A.5. Commentary received from research participants
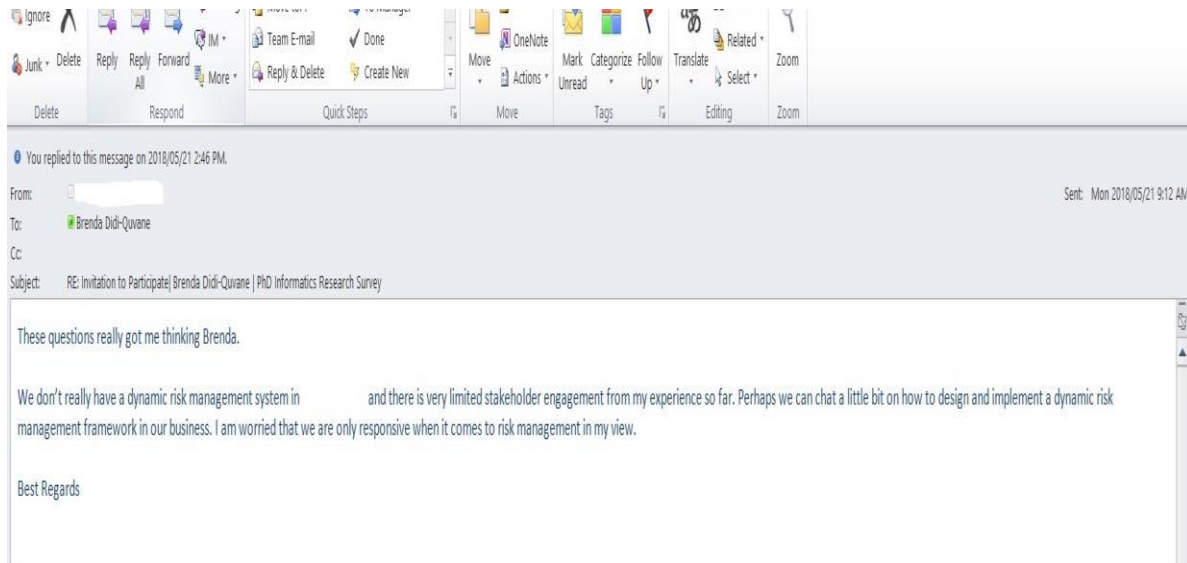
Image 3.1 Email responses from research participants_ email 1
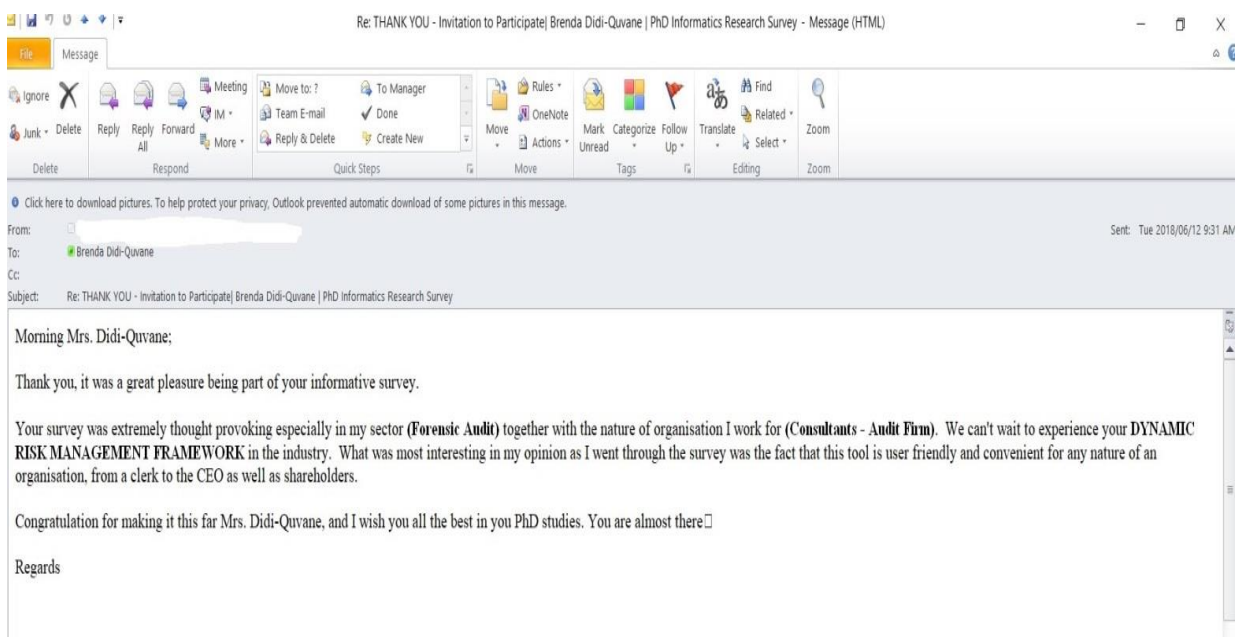
Image 3.2 Email responses from research participants_ email 2
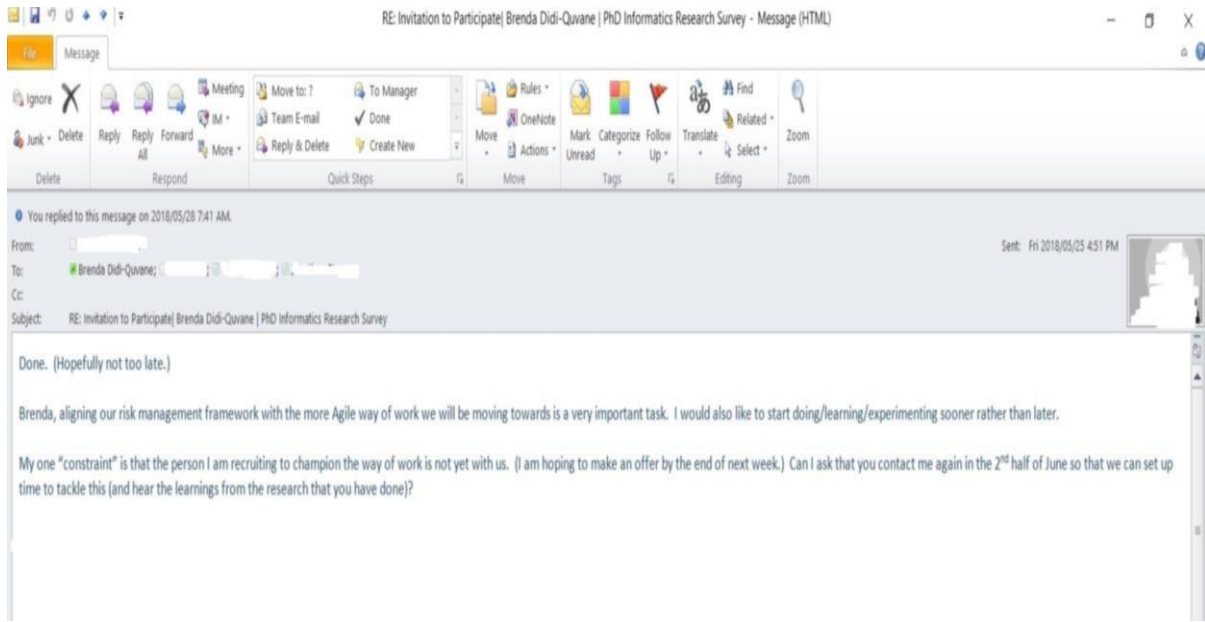
Image 3.3 Email responses from research participants_ email 3

Appendix B: Dynamic Capabilities Framework

B.1. Introduction

The initial dynamic risk management framework and principles outlined were developed in this research and defined what is core to effective risk management (agility and resilience), the dynamic risk management principles to be adopted, the dynamic capability to be developed and the organisational agility attributes to be considered when managing risk within a dynamic environment.
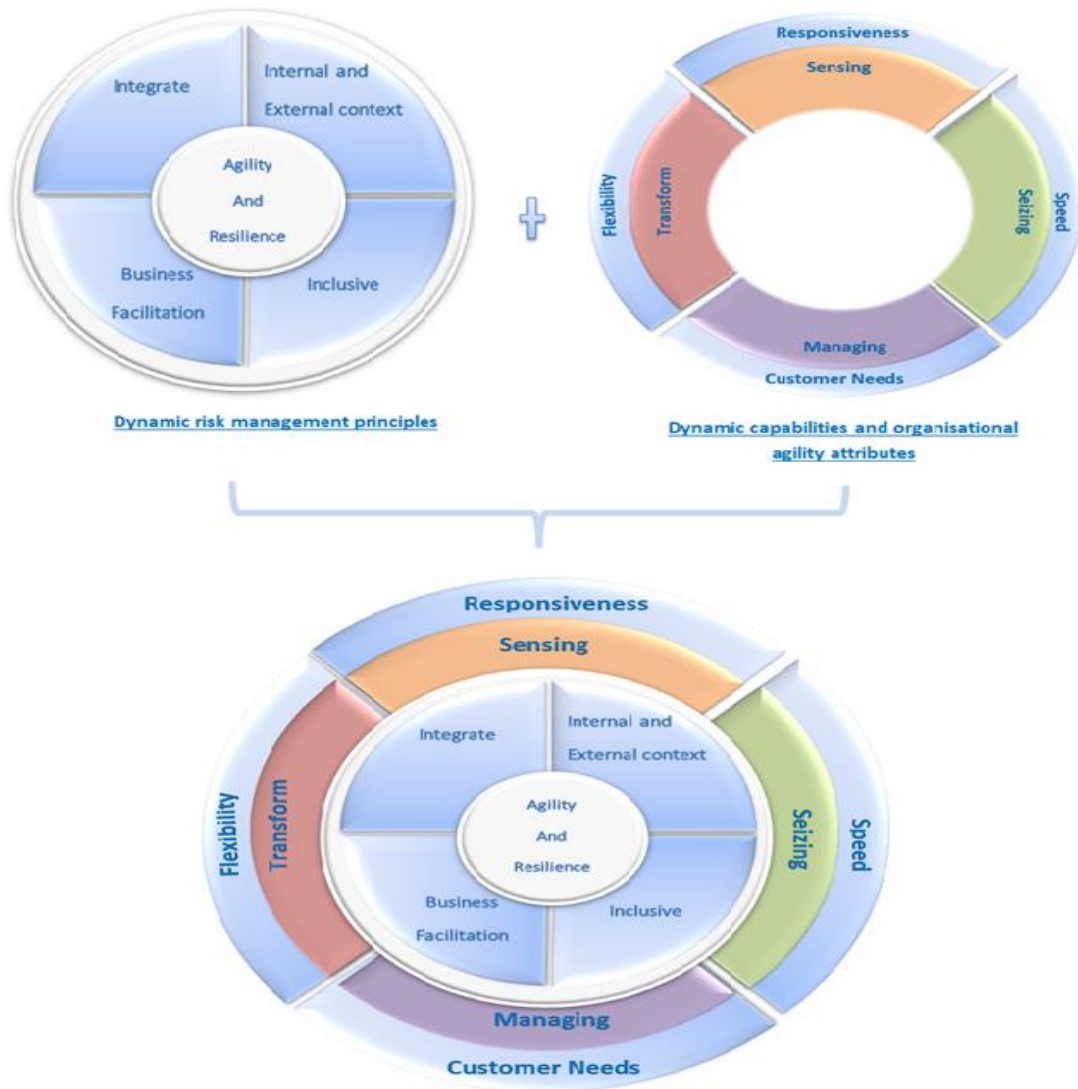
B.2. Proof of Concept - Semi-Structure interviews

Five interview participants were selected based on their job level and experience, these being the Group CRO of a traditional organisation, the Managing partner of Global Investments (exponential organisations), the Group Strategist of a traditional organisation that has adopted agile ways of work within their IT division, the Head of Operational risk in financial services as well as the CEO of an agile company. .

The objectives of these evaluations were three-fold:

- Firstly, to validate the dynamic risk management framework principles identified;
- Secondly, to determine whether the framework would and could be applied across responsive organisations; and

- Thirdly, to determine the gaps that may exist within the framework.

B.3. Evaluation interview – presentation

B.4. Revised dynamic risk management framework

The revised dynamic risk management framework was developed during the evaluation phase of the study. The final version of the framework is inclusive of an assessment tool that can be applied at each phase defined within the framework.